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UNIVERSITY OF MICHIGAN
WARM AIR HEATER SPECIAL

AMERICAN ARTISAN and Hardware Record

Vol. 80. No. 26.

620 SOUTH MICHIGAN AVENUE, CHICAGO, DECEMBER 25, 1920.

\$2.00 Per Year.

Special Warm Air Heating Features In This Issue

Warm Air Heater Research Work of the
University of Illinois

Price Situation Review

The Over-Size Warm Air Heater

The Pipeless Warm Air Heater

Work of the Research Bureau of the American
Society of Heating and Ventilating Engineers

Cooperation Between Manufacturers and Dealers

What Customers Want to Know

Use of Manufacturers' Advertising Helps

Examples of Proper Installation of Warm Air
Heaters

*"It's
some
heater"*



THAT'S what hundreds of dealers have told us when sending in their orders.

They had merely read over the list of specifications, studied the features and then relied on this statement from us—*"If the PREMIER isn't just what we say it is and it doesn't come up strictly in accordance with the description given, fire it right back at us at our expense."*

We make this same offer to you and we want to send the complete details for your inspection right now.

We at the PREMIER plant are backing up the PREMIER to the limit because we know it's good. Like our dealers we too think *"It's some Heater"* and we believe that you will agree with us once you have looked into its merits.

The PREMIER is a better furnace — a better warm air heater for the user and a better profit maker for the dealer.

As soon as we hear from you we will mail complete particulars.

Let us tell you about our sales plan and the agency for your territory. Write today.

PREMIER WARM AIR HEATER COMPANY

Manufacturers of
PIPE AND PIPELESS HEATERS
DOWAGIAC, MICHIGAN

PREMIER

FOUNDED 1880
BY
DANIEL STERN
Thoroughly Covers
The Hardware, Stove,
Sheet Metal, and Warm
Air Heating and Ventila-
ting Interests

AMERICAN ARTISAN and Hardware Record

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AND
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Merry Christmas and Happy New Year to you and yours!

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By the time this issue reaches our subscribers Christmas will be past, and the New Year will be less than a week

A Prosperous ahead. For the coming year
And Happy you have our most hearty
New Year wishes for the continued suc-

cess and prosperity of your business, with the assurance that everything that we are in position to do in the matter of co-operating with you to that purpose will be gladly undertaken and carried through.

American Artisan and Hardware Record will thus be even more valuable to you because more helpful, in every department. No matter how much assistance we have rendered you in the past, you can safely count on finding more helpful information, more useful instruction, more sales and profit-producing suggestions in our editorial and departmental pages. 1921 will break all former records of this publication in general usefulness to our subscribers.

This issue will give you some idea of what we mean. The man who is engaged in the installation of Warm Air Heaters will recognize that in one feature alone—that pertaining to actual installations—we have given more real instructive information in this single issue than has been done in all the issues in one year by any other publication, and the same measure of constructive selling information will be furnished for all the other departments during 1921.

In this matter our readers can be of material assistance to us and to themselves and we feel sure that you will do your share in helping us to make American Artisan and Hardware Record of even greater service, by telling us of the successful selling campaigns you have conducted, for after all, the greatest pleasure that a business man derives

from his success is gained by sharing that success with his friends, and nowadays our fellow business men are our friends.

With these thoughts we express again our sincere wishes for a Happy and Prosperous New Year to all.

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In this issue is published the most extensive review of the Warm Air Heating and Ventilating Industry that has ever been printed. The special features are of still greater interest and contain a larger amount of highly instructive information than have ever been published by any trade paper in this field.

Progress of Warm Air Heating

From the hundreds of letters which were received in reply to questionnaires sent to manufacturers and dealer-installers, it is evident that material progress has been made during 1920, in spite of the many adverse conditions with which this industry has been faced for the past three years.

It is a matter of congratulation that in the matter of installation much improvement is shown, evidencing the fact that the local dealers are giving more attention to this highly important point.

The future importance of the warm air heater depends, in its last analysis, on the manner in which the installer performs his work, and it is therefore a decidedly hopeful sign that greater care is given by him to the planning and layout of his work in this respect. Many of the manufacturers co-operate with their local representatives by furnishing drawings and directions for installations, thus performing a service, not only for their own customers, but also for the industry at large, because a well installed warm air heating apparatus helps to sell others, and conversely, a poor job acts as a deterrent, thus injuring not only the man who sold the

apparatus, but every other installer in the neighborhood.

As to the future, it is the concerted opinion of all who have given the subject any study, that when home building is once started in general, there will be a tremendous demand for warm air heaters.

As an indication, it may be stated that of the 275,000 warm air heaters which were made and installed during 1920, approximately 70 per cent were for "replacement," either of old, worn out warm air heaters or of stoves. It is, therefore, reasonable to expect that during 1921 and 1922 the normal increase in manufacture will not be even approximately large enough to take care of the demand for warm air heaters.

It must be kept in mind, however, that only by a continued and universal improvement in the matter of installation can the installer reap the fullest possible benefit of the great home building movement which is bound to be started in 1921.

Among the various suggestions which have been made by manufacturers and installers as to this point, probably the one most interesting and most practical is that a series of group meetings of installers be arranged for at conveniently located cities, where a one or two days' session will be conducted by experts in installation work, with blackboard demonstrations and pictorial descriptions of methods by which the usual and unusual problems will be explained in detail and practical solutions worked out.

With these introductory remarks, the 1920 Warm Air Heater Special is presented for the careful study by all interested in the further progress of this important industry.

♦ ♦ ♦ ♦ ♦

Experience ought to be the best teacher; the trouble with many of us however, is that

**Willing to
Learn from
Experience**

we don't like to take lessons from the experience of any one but ourselves—and often not even from that.

The fact remains, nevertheless, that the least expensive and yet most efficient form of teaching we can have, is gained from the experiences of others—not only of those who have made a success, but also of those who have failed.

From the first group, we may learn how to

do certain things better; new methods that we can apply with advantage in our business.

From the second group, we may learn what to avoid; why certain methods or procedures will not prove successful in our business.

The principal reason for our failure to learn from the experience of others is based on our own unwillingness to realize the fact that the nature of our business is less likely to be different from that of others, or that the conditions under which we do business are less likely to be different from those of others than we prefer to believe.

One great outstanding fact which has been established beyond controversy is, that retailing in rural communities—broadly speaking—is done under exactly the same conditions in Vermont, Georgia or New Mexico as pertains in North Dakota, Illinois or New Jersey, and the sooner the individual retail hardware dealer comes to a realization of that fact and apply the lesson contained therein, the sooner his business will commence to go ahead as it ought to do.

How has this fact been established, you say?

By this other fact that the retail mail order houses are selling housewares, stoves and all other items classed as hardware by means of identical pieces of advertising material in every section of the United States.

They are dealing with the same people that you deal with or with whom you would want to deal—and they are doing it through just one medium: regular and persistent advertising; specific, seasonable advertising, telling how much service may be obtained, for example, from a washing machine; how much easier the week's washing may be done; how little actual labor is necessary; how well the machine is put together; how little the cost is in comparison with its great convenience.

Many retail hardware dealers have learned this lesson to their great advantage, but a far larger number are still refusing to learn, either from the successful experiences of their fellow business men and of the retail mail order houses, or from the failures of those who "don't believe in advertising," and of those "whose trade is peculiar and won't pay attention to advertising."

If you belong in the group referred to in the preceding paragraph, why don't you take a tumble to yourself?

Random Notes and Sketches

By Sidney Arnold

An old darky minister announced that he had invented an automatic collection basket, which would be passed around by the deacons of his church.

"It is so arranged, my brethren," said he, "dat if you drop a quatah or half dollah, it falls noiselessly on a redplush cushion; if you drop a nickel it will ring a bell dat can indistinctually be heard by de entiah congregation; but if you let fall a button, my brethren, it will fiah off a pistol."

* * *

Hoot Gibson, Universal star, was sitting in a Los Angeles hotel lobby, a few evenings ago, when he thought he recognized a friend, a physician, a few feet away. Hoot sauntered over and said to the man:

"Pardon me, but are you Dr. Walters?"

"No," replied the stranger, "but I know where you can get some for \$22 a quart."

* * *

Two young ladies on the promenade of a fashionable seaside resort had been watching the vessel through a telescope loaned them by an ancient mariner. On handing the glass back one of them remarked that it was a very good one.

"Yes, miss," said the old tar, "that telescope was given me by Lord Nelson."

"Mercy, man! Why, Lord Nelson has been dead for more than 100 years!"

"Well, I'm blowed," remarked the salty one, quite unabashed, "'ow the time do fly!"

* * *

"I think children are not so observing as they used to be," said a member of the school board to a teacher whose class he was visiting.

"I hadn't noticed it," said the teacher.

"I'll prove it to you," said the school officer, pompously. Turning to the class, he said:

"Some one give me a number."

"Thirty-seven," said a little girl, eagerly.

He wrote "73" on the board. Nothing was said.

"Well, some one else give me a number."

"Fifty-seven," said another child.

He wrote "75," and smiled knowingly at the teacher when nothing was said. He called for a third number, and fairly gasped at the indignation manifested by a small, red-faced urchin, who said:

"Seventy-seven, and see if you can change that."

* * *

An old lady from the country went recently to a department store and began examining a piece of cotton print.

She pulled it this way and that, held it up to the light in different positions, wetted a corner and rubbed it between her fingers, trying if the colors were good. Then she paused a while, seemingly not entirely satisfied.

At last she cut off a piece with a pair of scissors she had dangling at her side, and, handing it to a tall, gawky looking girl of 16 standing beside her, said:

"Here, Lizzy Jane, you take an' chew that an' see if it fades."

A member of royalty recently fell in with a genuine English humorist, and she is threatening to reward him.

She was going through a hospital, when she came to a young man of most happy disposition.

He was convalescent. She chatted with him for some time.

When she went on her rounds she left a valuable package with him, saying, as she placed it beside his chair:

"Will you please keep your eye on it?"

When she returned the chair was vacant and on it was a glass eye with a note saying:

"I did as you requested."

* * *

Late in the evening, a farmer drove upon the scales in a retail coal yard. After the dealer had weighed his wagon, the farmer said he wanted 500 pounds of soft coal.

"All right, get it from No. 7 bin," said the dealer; "but you'll have to load it yourself, as the men have all gone home."

When the farmer drove back on the scales the dealer weighed the wagon again, and sticking his head out of the door, announced, "Just 550 pounds."

"Five hundred and fifty pounds," raved the farmer, "I haven't got a pound. The bin is locked and I came back after the key."

* * *

At a banquet given by a large body of educators the speaker of the evening arose, and began his address with the words: "Long live the teachers!"

He was interrupted by a tall emaciated young man who arose from the rear of the room and in a sepulchral voice queried: "On what?"

* * *

I haven't any recent medical statistics on the question, but I am inclined to believe that the number of cases of liver trouble is on the increase in certain lines of business.

Several times recently, I have run across business men of a bilious turn of mind, who actually snarl at any suggestion of the smile as a factor in buying or selling or producing things.

For all my friends and with special reference to the fellows whose systems are overloaded with bile, I am reproducing herewith the stanzas of Eugene Black, entitled:

The Smiler.

There's an idiotic fellow whom I meet where'er I go;
He's the crazy kind of fellow all the little children know.
You wouldn't think him silly from his manner or his style;
Still, it seems he must be foolish, for he always wears a smile.

When the way is long and weary and the load is hard to bear,

When you're weighted down with trouble and there's no one seems to care,

That's the time this foolish fellow comes a-singing up the road,

With a word and smile to cheer you and to help you with your load.

Yes, he's just a foolish fellow, with the eyes that can not see

All the misery and sadness that are plain to you and me.
But he knows the joy of living, all that makes the world worth while;

And I'd like to be as foolish as the man behind the smile.

Up-to-the-Minute News Siftings

*Items of Interest to Dealers Gleaned from Many Fields.
National and Local Business Plans, Problems, and Practices.*

SOUTHERN STOVE MANUFACTURERS ELECT NEW OFFICERS.

At the annual meeting of the Southern Stove Manufacturers' Association recently held at Evansville, Indiana, the following officers were elected:

President, Walter Terstegge, President of the Anchor Stove and Range Company, New Albany, Indiana.

Vice-president, C. E. Randall, President of the Knox Stove Works, Knoxville, Tennessee.

Treasurer, Sol Reese, Vice-president, Southern Stove Works, Evansville, Indiana.

Secretary, W. H. Cloud, Louisville, Kentucky.

Executive Committee, A. Randle, President Southern Cooperative Foundry Company, Rome, Georgia, chairman; B. E. McCarthy, President, Phillips & Buttorff, Nashville, Tennessee; C. L. Hardwick, Hardwick Stove Company, Cleveland, Tennessee; F. S. Ouerbacker, O. K. Stove & Range Company, Louisville, Kentucky; H. J. Karges, Indiana Stove Works, Evansville, Indiana.

The next regular quarterly meeting will be held in the Seelbach Hotel, Louisville, Tuesday, March first.

Registers Trade-Mark for Stoves and Heaters.

American Stove Company, St. Louis, Missouri, has procured United States Patent Office registration,

**DIRECT
ACTION**
137,907.

under number 137,907, for the trade-mark shown herewith. The particular description of goods to which it is applied is gas, vapor, and oil stoves and heaters. The Company claims use of this trade-mark since February, 1897.

All Lines of Business Favor Use of Trade Acceptance.

The annual report of the Trade Acceptance Committee of the American Acceptance Council, presented at the yearly meeting of that organization, was as follows:

"At the beginning of the year there was much concern regarding the exchange and collection charges that were being applied against trade acceptances. A committee including three merchants, two Federal Reserve representatives and five bankers, was appointed. This problem was assigned to that committee. After eight months' educational effort on the part of the committee it reported that a clearer understanding of

this problem had been reached and that the immediate necessity for the establishment of a uniform schedule of service, exchange and collection charges had been relieved and that it is believed that where banks determine to make a charge for the service of collecting trade acceptances, they may be depended upon individually to make satisfactory arrangements with their respective customers.

"A committee was appointed charged with the responsibility of devising the most efficient and economical method of handling trade acceptances within the banks and business houses. This committee includes four bankers, two Federal Reserve bank representatives and four business men—trade acceptance users. While the committee has rendered valuable service and made considerable progress with its work, it has not submitted a complete report. It is believed, however, that committee will develop and place at the disposal of banks and trade acceptance users a method that will enable a great saving of labor and expense in the handling of trade acceptances.

"A careful survey of the year shows that the number of trade acceptance users has increased rapidly and includes practically every line of business that makes sales on the time basis. There are more than 20,000 known users, and where the trade acceptance has been legitimately used the results have been eminently satisfactory. Its use has enabled an equal amount of capital to do a greater amount of service; it has shortened the credit period, has made collections more certain, has eliminated many claims and disputes, has lessened the number of cancellations or orders, has reduced the expense of operation both for the buyer and for the seller, has been the means of stabilizing the business involved and has produced a character of strictly liquid paper. It has brought transactions out into the open, where they can be viewed and treated upon their merits.

"Some complaint has arisen because of trade acceptances not being purchased freely in the open market. While the development of the open market for trade acceptances is a slow process, steady progress is being made, and there is a demand from investors for bank endorsed trade acceptances of the best concerns. Where this class of paper is offered it has moved satisfactorily at a rate of from $\frac{3}{4}$ to 1 per cent better than single name commercial paper. It is quite certain that trade acceptances originating outside of the leading financial centers will necessarily find lodgment in the local banks where the names are known. The expense of credit investigation on the small amounts and scattered names will preclude their coming into the open market.

"As an evidence of the growth in the use of trade acceptance, one may refer to the statistics of the Federal Reserve banks. The Federal Reserve banks discounted for their members during the

first nine months of the year 1920 trade acceptances aggregating \$141,317,025; in the year 1919, \$76,968,068. They purchased in their open market operations during the first nine months of 1920 \$67,573,322, while the total for the first nine months of 1919 was only \$22,801,060.

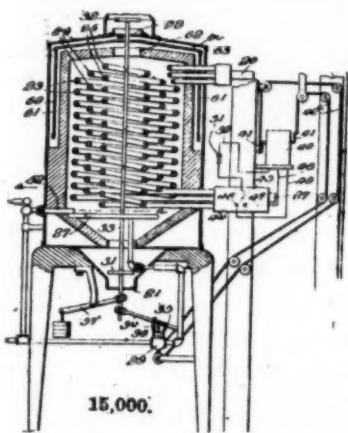
"Because of the existence of a lender's market throughout the year the preferential rate of discount on trade acceptances has had less effect and has been less operative than it would be under ordinary conditions.

"While trade acceptances are being regarded everywhere as better than single name paper, there should not and will not be any letup on the matter of analyzing the condition of acceptors, drawers and indorsers on such paper. Bankers and investors will naturally apply the same acid test to trade acceptances that is applied to any credit risk.

"While the progress for the year has been very satisfactory, your committee believes that the efforts to inform the people as to the true merits of the acceptance method financing should be intensified during the coming year. Experience has demonstrated that the method is sound and efficient; is here to stay; is giving powerful aid to American foreign and domestic commerce; deserves careful study and thoughtful consideration of every business man. Your committee believes its continued success and further helpfulness are dependant entirely upon honest and proper application."

Assigns United States Patent Rights for a Heater.

Walter K. Stafford, Newton, Massachusetts, assignor to American Stove Company, St. Louis, Missouri, a Corporation of New Jersey, has been granted United States patent rights, under number 15,000, for a heater described as follows:



A gas cooking oven having means for retaining the heat therein when the burner is extinguished, comprising a cooking oven having a door, an inlet opening and an outlet opening in its wall forming an air passage therethrough, a valve for opening and closing said passage

passage, a burner for said chamber, a fuel supply for said burner, a fuel valve controlling the fuel supply to said burner, and an operative connection between the fuel valve and the air passage valve so arranged that the opening and closing of the fuel valve will correspondingly open and close the passage valve, whereby the opening of the fuel valve automatically opens the said passage and the closing of the fuel valve automatically closes the said passage and thereby retains the accumulated heat in the closed oven for continuing the cooking therein after the burner is extinguished.

Presents New Ideal for Business Organizations.

Business must correct its own "misdemeanors" if its voice of protest is to have a larger influence in correcting those of others, said Joseph H. Defrees, president of the Chamber of Commerce of the United States, in an address delivered at the convention of the American Bankers' Association recently in session at Washington, D. C.

"One of the most fruitful sources of the unrest in this country at the present time," said Mr. Defrees, "is the belief on the part of a great number that business in many instances is securing an inordinate profit. It is the theme of the agitator, and is used as justification for various unfair exactions which are put upon business. We are quite ready to complain in the public interest, about excess profit taxes and inadequate production for a fair wage. Let us do all we can to correct our own misdemeanors and then our voice of protest will have a larger influence in correcting those of others.

"Let it be understood by all commercial and trade organizations that if a project is not for the good of the public, it is not for the good of business. Action upon this basis will inevitably result in a growing consciousness on the part of the public that if a measure is opposed to the business interest of the nation, it can scarcely be for the good of the public. The interdependence of the two propositions I have just stated becomes apparent when the difference in the comfort and basis of living of all our citizens of whatever vocation in the present day is compared with that of generations, even so lately in the past as to be within the memory of many of us, and when it is recognized, as it must be, that without the wonderful progress of manufacture, commerce and finance the improvement would not have been possible.

"I regard the growing ability of American business men of all sorts—bankers, railroad men, manufacturers, merchants and farmers—to organize and fraternize in the food of helpfulness and in sympathy with the public interest, as providing a solvent for our present and future troubles the value of which may be without limit."

Wife of William F. Habicht Passes Away.

Sincere sympathy is expressed throughout the stove trade for William F. Habicht, prominent in the affairs of the Stove Salesmen's Association of Pennsylvania, on account of the great loss which he suffered in the death of his wife, Florence E. Habicht, who passed away December 15th at her residence, 4837 Walnut Street, Philadelphia, Pennsylvania.

The funeral services were held Saturday, December 18th, at the Oliver H. Bair Building, 1820 Chestnut Street, Philadelphia, and interment was private.

Mrs. Habicht was a woman of exceptional sweetness of character. She endeared herself to numerous friends by her kindness, courtesy, patience, and broadmindedness.

The Week's Hardware Record

*What Retailers, Jobbers, and Manufacturers Are Doing.
Latest Selling Methods. Experiences of Successful Men.*

Your attention is directed to an exclusive feature of AMERICAN ARTISAN AND HARDWARE RECORD. It has the distinction of being the only publication which gives Western hardware and metal prices corrected weekly. You will find these prices on pages 126 to 131 inclusive.

Says Present Depression Will End in Thirty Days.

The bottom of the present business depression will be reached in the next thirty days, in the opinion of Archer Wall Douglas, chairman of the Committee on Statistics and Standards of the Chamber of Commerce of the United States, in his monthly report on general business conditions, made public today in the Nation's Business.

"Advances of any moment in the prices of agricultural products will materially change the situation for the better, and reductions in the prices of commodities are likely to cause increased business in all industrial sections," says Mr. Douglas.

The report points out "that acute phases of the present depression will wear away steadily as the public adjusts itself to changed conditions brought about by a return to normal. Unfavorable agricultural situations, especially, have an unexpected way of remedying themselves.

"From the unfounded fears of last spring of bread lines in the cities and shortage of food everywhere, we are awakened to the startling realization of a harvest so great that we can not at once find an adequate market for our surplus products.

So there ensues that inexorable law of supply and demand which decrees that overproduction is always accompanied by falling prices.

This phase of the situation is peculiarly accentuated in the southern states where the second largest crop of cotton grown is met by a much reduced demand both at home and abroad.

Moreover, much of the cotton is a low grade mid-ling because of the boll weevil and much unfavorable weather and for such grades there is now practically no market at any price.

"The same condition of practically no demand even at prices ruinously low to the producer is likewise true of rice in Alabama, Louisiana and East Texas, and of tobacco in the two Carolinas and Virginia westward through Tennessee, Kentucky, Ohio and Wisconsin. This is also true in much less measure in some sections of the grain growing states of such staples as wheat and Irish potatoes.

"There has been very little liquidation so far, and the general attitude for the present is that of waiting

for farm products to go higher or for manufactured products to go lower or for both to happen and thus bring about a needed readjustment.

"One observer in the southwest describes the situation by saying that the country is rich in every product, plenty of crops unsold, hogs, chickens, turkeys, cattle, good teams and farm equipment but no money and banks loaned up.

The answer, of course, is that the natural laws of supply and demand will ultimately work out the situation and no remedies or plans to bridge over the emergency can obscure this fact.

"There is a general belief that there will be a revival of building in the spring, because conditions will be more favorable, and the necessities of the situation are more pressing."

Registers Trade-Mark in Patent Office.

Kelly Axe Manufacturing Company, Incorporated, Charleston, West Virginia, and New York City, has procured United States Patent Office registration, under number 133,188, for the trade-mark shown herewith: The particular description of goods to which it is applied is axes, hatchets, machetes, hammers, bush hooks, and scythes. The Company claims use of this trade-mark since January, 1890.



Cutlery Firm Is Incorporated.

George Olson, Charles R. Stewart, 9 Clinton Street, Newark, New Jersey, and others have incorporated the Empire Cutlery & Drop Forging Company, Newark, New Jersey, with a capital stock of \$50,000.

Registers Trade-Marks for Razor Strops.

Under 137,884, United States Patent Office registration has been granted to the Illinois Razor Strop Company, Chicago, Illinois, for the trade-mark shown herewith. The particular description of goods to which it is applied is razor strops. The Company claims use of this trade-mark since



January 1, 1909.

The Illinois Razor Strop Company, Chicago, Illinois, has also procured United States Patent Office registration under number 137,885 for the trade-mark reproduced herewith. The particular description of goods to which this trade-mark applies is razor strops. The Company claims use since May 1, 1920.



Good Ideas for Window Display

Practical Lessons from Exhibits in AMERICAN ARTISAN AND HARDWARE RECORD Window Display Competition. How to Get More Passers-By to Come into Your Store.

WINDOW DISPLAY OF CUTLERY IS WELL DESIGNED.

General Pershing is a model of neatness and the ideal of trim, upstanding American officer.

Even the least observant of people could not fail to notice the smoothness of his skin.

Using a picture of General Pershing in a center of a display of cutlery in which safety razors and strops are featured is a good bit of psychology.

The great American general is an example of perfect grooming.

The suggestion is more or less clearly conveyed by the use of his picture in connection with this exhibit

serve to give group effects to the articles displayed upon them.

Excellent use was made of advertising helps furnished by the manufacturers.

A common blunder in the use of such helps was carefully avoided.

Altogether too frequently window trimmers overload their displays with cut outs and posters to the detriment of the general impression desired to be created by the exhibit of goods.

That is to say, too much semblance of advertising defeats the purpose of advertising.

In other words, in such circumstances, the attention is drawn to the advertising as advertising instead of



Window Display of Cutlery Planned and Arranged by Philip Leavy for Walbridge and Company, Buffalo, New York, and Awarded Honorable Mention in AMERICAN ARTISAN AND HARDWARE RECORD Window Display Competition.

that the right kind of razors and shaving accessories have a lot to do with one's personal appearance.

Indeed, almost any pacifist would stop to look into a window with a picture of General Pershing as one of its attractions.

But the window display of cutlery under discussion—which was planned and arranged by Philip Leavy for Walbridge and Company, Buffalo, New York—is not wholly dependent upon the Pershing picture for its power to arrest the notice of the passerby.

The goods are displayed in such a variety of forms as to cause them to stand out clearly from the background.

The wheels trimmed in grey and purple crêpe paper

to the advertising as a means of conveying a message.

Mr. Leavy in designing the window display of cutlery for Walbridge and Company—which was awarded Honorable Mention in AMERICAN ARTISAN AND HARDWARE RECORD Window Display Competition—states that the Company specializes on Twinplex strops as one of the big items in the cutlery department. Naturally, therefore, he gave this article a central position in the display.

He was wise enough, however, not to use too many of the cut outs of the manufacturers of the Twinplex strops.

The connection between razors and strops and pen knives and scissors and other cutlery is close and logical.

Consequently, Mr. Leavy did not weaken the effect of this design by the introduction of such related commodities as scissors, manicure sets, and pen knives.

Good results were obtained from this window exhibit, because it not only increased the sales of the articles during the ten days that it was in the window, but also diffused among customers of the store the knowledge that its cutlery department is comprehensive and well stocked.

Window Display Competition Is Means to Get More Customers.

The first need in retail business is customers.

Therefore, all the efforts of the merchant should be directed to that end.

No detail, how insignificant soever it may be, should be neglected which has a bearing upon the increase of the number of patrons of the store.

The purpose of making window displays is to induce passers-by to come into the establishment and purchase one or more of its commodities.

Consequently, in planning window displays, the thought to keep in mind is, will this arrangement of goods create buying desire in the observer?

Mere prettiness is not enough. Ornate backgrounds are not sufficient. Brilliant lighting effects are not adequate.

There must be, in addition to these things, suggestion of usefulness and service in the arrangement of the articles.

It is difficult to put the idea into words without covering many pages of type.

It is best expressed in actual window displays.

From week to week, such window displays are shown in AMERICAN ARTISAN AND HARDWARE RECORD. These displays were entered in the preceding window display competition and were judged to be sufficiently meritorious to warrant their publication in these pages.

A new window display competition is now under way. It affords an opportunity for practice through contest and comparison.

The competition is open to all dealers and clerks in the hardware and allied trades.

You are invited to participate.

Have photographs made of your best window displays. Write accurate descriptions of the arrangements, and send them for entry in this competition.

Study the simple rules of the contest herewith appended:

Award of Prizes.

The prizes will be awarded as follows:

First prize, \$50.00 in cash, for the best photograph and description received of window display of hardware of kindred lines;

Second prize, \$25.00 in cash, for the photograph and description second in merit;

Third prize, \$15.00 in cash, for the photograph and description third in order of excellence;

Fourth prize, \$10.00 in cash, for the photograph and description fourth in degree of worthiness.

Conditions of Competition.

The conditions of the competition are as follows:

The photograph must be accompanied by descriptions of how the window displays were arranged and

the materials used. The description is important and hence should be adequate. These photographs and descriptions may be sent by mail or express, charges prepaid, and must reach this office not later than February 15, 1921. Address all photographs and descriptions to AMERICAN ARTISAN AND HARDWARE RECORD Window Display Competition, 620 South Michigan Avenue, Chicago, Illinois.

Each photograph and description must be signed by a fictitious name or device and the same name or device must be put in a sealed envelope containing the real name and address of the contestant. This sealed envelope is to be enclosed with the photograph. Contestants are permitted to enter as many photographs of displays as they please.

A Competition Committee of three will be appointed. One of them will be an expert window dresser and one an experienced hardware man. This Committee will pass upon the merits of all photographs and descriptions received, without knowing the names or addresses of the senders, and will decide the winners of the Competition.

AMERICAN ARTISAN AND HARDWARE RECORD reserves the right to publish all photographs and descriptions submitted.

Gets Trade-Mark Registered In Patent Office.

Pitard's Incorporated, New Orleans, Louisiana, has been granted United States Patent Office registration, under number 113,623½ for the trade-mark reproduced herewith. No claim is made to the words "Hardware, Wallpaper, Glass" and "Paints, Polishes Please Particular People" apart from the mark shown in the drawing. The particular description of goods to which it is applied is hammers, saws, hatchets, vises, screwdrivers, nail-pullers, draw knives, pocket knives, butcher knives, butcher steels, twist drills, hand drills, power drills, saws sets, files, bit braces, breast braces, carpenters' bits, and expansion bits. The Company claims use of this trade-mark since January 1, 1905.



Labor Gets More Than Eighty Per Cent of Product.

Due to inaccuracies of labor exponents, we are often afflicted with the statement that 2 per cent of the population owns 90 per cent of the wealth, which, of course, is a gross statistical error in that it omits the enumeration of all population under 21 years of age and omits the enumeration of wealth in small units.

But is usually an effective scarehead. An article in the "Annalist" puts both these shoes on the other feet by showing that labor is the holder of the nation's wealth and income, and that the return to capital upon the wealth of the country is less than 5 per cent and that wage-earners already receive more than 80 per cent of the produce of industry.

Retail Hardware Dealer Shows How to Overcome the Effects of the Competition of Mail Order Houses.

Compares His Prices with Those of Catalogue Houses and Proves that He Gives Customers Better Money Values.

C. T. Aid, President of the Aid Hardware Company, West Plains, Missouri, has been in business for thirty-five years and has money in the bank to show for the work and thought that he puts into the conduct of his very successful hardware store ("with dry goods department"), as he puts it.

One of the reasons for his success is that he knows the hardware business—from beginning to end, from the buying of his goods to the getting of the money for his merchandise.

As a result of this knowledge, he is not scared of the mail order houses. He knows that on some items their cost prices are lower than his, and that they do sell some things cheaper than he does, but he also knows that on the great majority of his stock his selling prices are at least as low and in many cases lower than their's.

Furthermore, he makes no bones about telling what he knows, and he tells it in such a way that when Mr. and Mrs. Farmer read one of his advertisements, his statements carry conviction and bring in new customers to his store, as well as hold his old trade.

The deadly parallel shown in the accompanying reproduction of full page advertisements in the *Howell County Gazette* and the *West Plains Journal* of November 25th (Figure 1), prove conclusively that the people in Howell County can buy many every-day hardware articles cheaper from the Aid Hardware Company than from Montgomery Ward & Company, when cost of money order and freight charges are included, as they should, to make a fair comparison.

Fifty items are quoted. The first price column is that of the mail order house, while the second column shows the prices of the Aid Hardware Company. Thirty-six of these are lower in price when bought from the latter, while

the mail order house is lower on only seven articles, and on the remaining seven there is no difference.

If you add the prices in each column you will find that the total shows \$115.59 for the mail order house, as against \$103.93 for the Aid Hardware Company, to which difference in its favor must be added the cost of draft or money order and the freight charges.

Leaving these two items out of consideration, there is still a difference of \$11.66—or 11¼ per cent of the total—in favor of the home town hardware store. But

REPRINT FROM THE HOWELL COUNTY GAZETTE AND THE WEST PLAINS JOURNAL, WEST PLAINS, MO., NOVEMBER 25, 1920

A HEART TO HEART TALK

WITH OUR CUSTOMERS AND FRIENDS

Most of our friends and customers know our position on the Mail Order question. We have always claimed that these big operations with all their millions were another brand of a help to the people that needed it; that all they wanted was the Cream, the REAL BUTTER FAT; that the separated milk was good enough for the poor cities (we country merchants). This kind of milk may keep us alive, but very few of us get fat on it.

They generally tell the truth in their advertisements, but they do it in such a way that they feel in many instances. Take ourselves, for example. In Montgomery Ward & Company's latest Bulletin, "Price Cuts That Will Astonish You," they advertise Child Seal Congoleum \$2.12 for \$2.00. We wrote the factory why they could do this, when they, themselves, were advertising the 2x12 rug in the Saturday Evening Post and other papers at \$18.00. They wrote us to read THE VERY FINE PRINT in this advertisement, and we would see that it was not a rug but a piece of Congoleum cut from a roll, and it would not have a border, and would not look finished. But we ordered this we would have got just what they advertised, but not what we had expected to get and something that we would never have been satisfied with, regardless of the low price.

We all know that they are great advertisers and employ the very highest talent in the country to write these advertisements. That they sell their LEADERS or ORDER STARTERS at a very low price, is well known by everyone, but take their catalogues through and there are hundreds of articles that are sold at low and lower when transportation charges are included, by your home country merchant.

We Wish To Call Your Attention to a Few Prices in Montgomery Ward and Company's No. 93 Catalogue

Montgomery Ward Prices	OUR Prices	Montgomery Ward Prices	OUR Prices
No. 3 Galvanized wash tub.....	\$ 1.72	4-qt. Glass Churn.....	2.45
6 inch Elbe.....	.24	Cleaver Water Fountain.....	.18
8 inch Mill File.....	.18	Wagon Seat Springs.....	2.95
6 inch Stove Pipe.....	.25	Wood Butter Lads.....	.22
Champion Spark Plug.....	.24	Rame Straps, 1 inch.....	.39
18 inch elm Horse Rasp.....	.77	No. 6 Horse Nails.....	.27
Stanley No. 45 Plane.....	15.28	25 lb. Tin Cans.....	2.55
Stanley Iron Smooth Plane, No. 2.....	4.18	No. 1 Victor Game Trap.....	.34
Stanley Iron Smooth Plane, No. 3.....	4.33	1 1/2 Victor Game Trap.....	.47
Stanley Iron Black Plane, No. 5.....	5.57	No. 2 Victor Game Trap.....	.50
Stanley Iron Fore Plane, No. 6.....	7.85	4-Ton Hammer Fork.....	1.42
10 inch Hack Saw Blades.....	.11	Grass Scythe.....	2.85
Key of Horse Shoes, 100 lb.....	8.98	R. F. D. Mail Boxes.....	.87
Spring Curry Comb.....	.21	Fence Staples, per lb.....	6.50
1 1/2 inch Breast Strap Slide.....	.10	Fence Staples 100 lb.....	2.60
100 Tubular Rivets.....	.28	Single Bit Axle Hauls.....	3.30
Flaw Handles.....	.43	Double Bit Axle Hauls.....	3.30
Wagon Bows.....	2.95	Schroder Auto Tire Gauge.....	1.50
Wagon Hickory Axle.....	2.95	White Enamel Combined Sash.....	2.45
Wagon Neck Yoke.....	1.95	White Enamel Combined, Large.....	3.19
Double Tree Clevis.....	.33	Brass Wash Boards.....	1.09
Swivel End Clevis.....	.29	Map Stick.....	.45
Whip Socket.....	.22	Wagon Cover.....	12.15
2-ft. Hay Trough.....	1.47	12 Ga. New Club Shot Gun Shells.....	.81
5 Gal. Milk Cans.....	4.75	16 Ga. New Club Shot Gun Shells.....	.90

It is not our intention to try and make you believe that we sell everything as cheap or cheaper than these large catalogue houses, for that would be an impossibility, as they have thousands of articles that there is no way to make comparisons, as they have no factory names or marks to distinguish them. Please remember in making these comparisons, we have not added anything for freight or express charges, which you will find out is very expensive at this time. Now, there is another important fact that we want to call to your mind. It takes the CARE, the real genuine article to get this catalogue stuff. With us, we have been selling you Hardware for THIRTY-FIVE YEARS ON TIME, and your CREDIT IS STILL GOOD WITH US. Thus you send your cash to Chicago from whence it never comes back!

At the present time Sears, Roebuck & Company is running one and two full page advertisements in all the large city Sunday papers on their Talking Machine Sale. It is headed in large letters "Send No Money," and tells how easy by making a small payment down and so much every month that anybody can own one of their fine machines. They also, call your attention to the ORDER BLANK to be filled out, that is part of their advertisement in the paper. It might be well for you to look it over carefully. In this Order Blank you sign, you state that you have always BEEN FASTIDIOUS in paying your obligations, and give YOUR PLEDGE to pay as agreed. If under age, then some member of your family who is OF AGE AND RESPONSIBLE should sign this order with you. They want to know just how long you have been located at your present address. If less than 5 years, your former address, your business occupation or profession, and they are very particular in knowing the NAME of the HEAD OF THE HOUSEHOLD.

After getting all of this, you would naturally think that it would suit most any body, but not them. OR, NO! For here is where the LITTLE FINGER COMES IN, on the top small lines at the bottom they want two names as references, which means the name of your banker, or minister, or dealer, or lawyer, or two of your best neighbors.

With this kind of an order signed up, we would not only sell you a talking machine on this dollar down and dollar forever, but would sell you a Farm Tractor, Binder, Mower, Cream Separator, Range, Furniture, in fact, anything we have, including our Ladies' Dress suits, with its hats, easy chairs and other comforts; our Oliver Plow and American Fence Day, all could go.

This is why we make the assertion at the beginning that the big mail order houses have no use for the poor farmer, mechanic or poor widow, that is helped every year by the Country Merchant; that it is the CREAM and the CREAM only they want.

ORDER BLANK

NAME, RESIDENCE AND CITY, CHARGE.....

You may fill out the SELF-ADDRESSING Envelope and the SELF-ADDRESSING Record on the last sheet which I have marked with an X, without any postage on my part to try unless I am perfectly satisfied.

If, after two weeks trial, I decide to keep and use the merchandise, I will send the five percent for the merchandise and my money, enclosed with it and for the same amount cash month, until paid in full; then the SELF-ADDRESSING and receive the property.

Should I decide, after two weeks trial that the SELF-ADDRESSING is not satisfactory I will notify you, and I will give you the merchandise as that I may send the merchandise as I like.

I have always been fastidious in paying my obligations and am making this statement for the purpose of indicating you to send me these terms, and I give you my promise that you may feel safe in trusting me to pay as agreed.

Signed.....

(Place your name here plainly and carefully. If under age, some member of the family who is of age and responsible should sign this order with you.)

Residence.....

City.....

State.....

I have been located at.....

For how long.....

My business occupation or profession.....

My former address.....

My banker, minister, or dealer, or lawyer, or two of my best neighbors.....

(Please give names of TWO references.)

DATE.....

AID HARDWARE CO.

(WITH DRY GOODS DEPARTMENT)

C. T. AID, President

Figure 1.—Full Page Advertisement of Aid Hardware Company, West Plains, Missouri, in Which President Aid Shows His Ability to Serve the People in His Locality Better Than Mail Order Houses Are Willing to Serve Them.

Mr. Aid's argument does not stop with the quoted prices.

He goes into the matter of credit, and here he gives Sears, Roebuck & Company a good sized black eye, when he compares his credit system with theirs.

Of course, it goes without saying that the Aid Hardware Company uses good judgment in granting credit, but in their credit system there is no demand for references or other information, such as is required in the "order blank" reproduced in the lower right hand corner of the announcement, the text of which is herewith reproduced in full size (Figure 2) in order that it may be more easily read and the significant points more readily understood.

ORDER BLANK 1628

SEARS, ROEBUCK AND CO., CHICAGO. Date.....192.....

.....You may ship me the SILVERTONE Phonograph and the SILVERTONE Records on the list above which I have marked with an (X), without any obligation on my part to buy unless I am perfectly satisfied.

If, after two weeks' trial, I decide to keep and use the instrument, I will send you the first payment for the phonograph and any records ordered with it and pay the same amount each month, until paid in full; then the SILVERTONE and records become my property.

Should I decide, after two weeks' trial that the SILVERTONE is not satisfactory I will notify you, and you are to give me instructions so that I may send the outfit back at your expense. You are also to return to me any transportation and cartage charges I have paid.

I have always been faithful in paying my obligations and am making this statement for the purpose of inducing you to grant me these terms, and I give you my pledge that you may feel safe in trusting me to pay as agreed.

Sign..... R. F. D. Box..... Street.....
Here..... No..... No..... and No.....

(Sign your name here plainly and carefully. If under age, some member of the family who is of age and responsible should sign this order with you.)

Postoffice..... County..... State.....

Shipping point.....

I have been located in..... If less than 5 years.....
this town since..... give former address.....

My business, occupation..... Do you wish shipment made.....
or profession is..... by express or freight?.....

Please give name of head of household to prevent mistakes and simplify the keeping of our records.

NAME OF HEAD OF HOUSEHOLD.....

(Please give names of TWO references.) REFERENCES:.....
NAME..... ADDRESS..... BUSINESS.....

Figure 2. Order Blank Which Has Objectionable Features.

Apparently, there is nothing objectionable in this order blank, but please note that two references are required. The names of these two persons who must, of course, be men of some property are worth a considerable sum of money to any mail order house. In fact, as high as \$10.00 a piece is being paid for good "prospects" by some concerns, but the mail order house makes it mandatory on the "come-on" to furnish these two good names for nothing, in addition to paying a very high price for the phonograph. Not a bad scheme for the mail order house.

AMERICAN ARTISAN AND HARDWARE RECORD has always maintained that the proper way to fight the efforts of the mail order houses to make inroads on the local dealer's trade, is to advertise consistently and continually—quoting specific prices on specific items and thus keeping the local people always informed of what he has for sale and how well he is in position to serve them.

The Aid Hardware Company is an exponent of this idea, and the success of this organization is the best possible proof that this idea is sound.

It is also to be kept in mind that it is not necessary, nor even advisable, to quote reduced prices in such advertisements. There are thousands of items in every well conducted retail hardware store which are sold regularly at lower prices than the mail order house offers them.

Trade-Marks for Manila Rope Are Registered.

The Portland Cordage Company, Portland, Oregon, have secured United States Patent Office registration,

"SEAPORT"

134,909..

under number 134,909, for the trade-mark depicted herewith.

The particular description of goods to which it is applied is

manila rops. Application for registration was filed July 13, 1920, and the Company claims use since March 1, 1920.



134,910.

Under number 134,910, the Portland Cordage Company, Portland, Oregon, has procured United States Patent Office registration for the trade-mark shown herewith. The particular description of goods to which this trade-mark applies is manila rope. The Company claims use since

March, 1920.

Lays Down Eight Rules for Business Conduct.

"Ideals in business are not unpractical. They are good business." So declares William Whitman, president of William Whitman & Company, one of the leading textile concerns of the world, in the preface of a beautifully bound and printed book, which the company has just issued, descriptive of the organization, whose total capitalization is \$57,000,000, and whose business conduct has been actuated, Mr. Whitman says, by the principles of idealism he lays down.

The "Rule of Honor," according to the book, is the one, and the first of "eight rules adopted for guidance in conducting our business," the other seven being, the rule of service, the rule of quality, the rule of uniformity, the rule of cooperation, the rule of cleanliness, the rule of hygiene and the rule of vigilance.

"America has become what it is by continually turning ideals into realities," writes Mr. Whitman, "and duty and self-interest impel us to continue this work of making a practical tomorrow out of the idea of today."

"The high ideal before business today is increasing service. The future of business will be determined by the degree in which it meets that duty by making itself increasingly useful to all, whether they be investor or worker, producer, or consumer."

"To make any statement that is only literally and not morally true; to make any agreement or promise without full reason to believe that it can be made good, to distinguish as between the obligation expressed in a note and the moral obligation of any maturing debt of any kind, to undermine the integrity of a national industry by insidious depreciation of quality by product—these are sure enemies of reputation and credit."

"The rule of honor commands faithful performance. It dictates that we shall always be ready to risk financial loss rather than to lose our self-respect."

"The mills and the organizations represented in this book have tried since their inception to practice the rules of cooperation between themselves and their employes. There has been much to do, and there remains much to learn. Their ideal has not yet been attained. What may have been accomplished thus far is, indeed, only a part of what they hope to do as they find themselves able to solve the necessary questions of practical ways and means."

Reviews the Arguments for and Against Price Guarantees.

Arguments for and against the practice of giving guarantees against price decline as carried on in the various industries are set forth in a bulletin issued by the Fabricated Production Department of the Chamber of Commerce of the United States.

This Department of the National Chamber has gone into the subject of guarantee against price decline and has assembled in compact form the attitude of the different lines of business as brought out before the Federal Trade Commission.

It is pointed out in the bulletin that the trade practice of guaranteeing against price decline is used in a wide variety of forms, such as guarantee against decline until date of shipment, guarantee against decline until date of delivery, guarantee against decline until a fixed date, guarantee against decline until the goods are sold, guarantee against decline of vendor's price only and guarantee against decline of the market price.

Here are some of the leading arguments favoring the practice from the manufacturer's standpoint as contained in the bulletin:

"It secures orders for his product in advance of the needs of the purchaser, enabling him to run his factory more steadily and arrange the use of his labor and raw materials to better advantage; enables him to ship his product as soon as finished and avoid the expense of warehousing it; secures larger orders and a larger volume of business; makes it possible for him to ship in carloads and avoid the expense of handling smaller shipments; assists in marketing new brands; reduces the number of salesmen's trips, since an entire season's business can be secured in one order; prevents cancellations in a falling market; is a strong means of getting business; and is necessary to manufactures of bulky product, difficult of storage.

Arguments favoring the practice from the wholesaler's and retailer's points of view are as follows:

It protects them against loss due to a falling market; permits early orders; avoids delays in shipment; insures ample stocks to meet unusual demands; permits ordering in large lots to save freight; permits placing orders more freely; responsibility for fixing prices should rest on the manufacturer because he is better posted concerning the prices of raw materials and primary markets; wholesaler's margin of profit is too small to risk market reductions; permits the handling of goods on a smaller margin, and therefore makes lower prices to consumer; enables small wholesalers to compete with larger concerns; enables small wholesalers to buy in large units; prevents manufacturers from selling direct to consumers, since the latter can not order in advance; necessary where goods are shipped long distances.

"Arguments in general *opposed* to the practice are as follows: That it is an unsound, unfair business practice. Unsound because it creates an artificial volume of orders for the manufacturer, on all of which his amount of net return is uncertain until a considerable time after all fabricating processes have been finished; unfair because it puts the wholesaler's and retailer's just shares of liability for market fluctuations upon the manufacturer, instead of preserving the equitable

rule of requiring each trade agency to carry its own burden of liability.

"That the practice tends to keep prices up because if a considerable number of manufacturers in one line of production have guaranteed prices and have therefore, placed themselves in a position to suffer loss if prices decline, their entire influence will naturally be exerted to prevent a decline.

"That if a majority of the manufacturers in one line of production have guaranteed prices and will lose if they decline, the price can not be reduced, because none of that particular product can be secured except through the agency of the manufacturers who have guaranteed and who are bound to try to maintain the prices until the liability under their guarantee has been discharged.

"That the practice operates to harass the small manufacturer because he must, in competition with his more powerful business rivals, who are guaranteeing prices, also offer this inducement to purchasers although he is not able financially to safely incur such a responsibility.

"That it introduces into trade an element of uncertainty and encourages speculation, that it encourages overproduction on the part of the manufacturer in that, due to the abnormal orders received, the volume of possible business seems to be larger than it really is; that it disturbs the well-established rule, which has proven to be sound and conservative, of fixing finally the selling price of goods at the time of the transaction.

"That it tends to deceive both the manufacturer and wholesaler, because the latter, since he is guaranteed against loss, is tempted to relax his vigilance in watching and studying the basic influences in his market and in estimating conservatively his real needs, and the former (the manufacturer) has an abundance of orders in sight, but taken under a contract which may compel him to fill them at a loss.

"In an attempt to arrive at some conclusion in this controversy, there are certain features of this form of sale transaction upon which both sides agree, and which should be carefully considered.

"The manufacturer's guarantee involves him in a liability of unknown degree; it introduces an element of speculation and uncertainty into his business; according to the law of a fair division of trade risk, he is carrying the burden of the wholesaler's business and oftentimes that of the retailer, over which he has no control.

"The affirmative statements that the practice favored purchasing 'freely,' carrying 'ample stocks,' ordering in 'large quantities,' and still did not encourage excessive and speculative buying are difficult to reconcile when considered in connection with the fact that the terms of the transaction were such that the buyer could not suffer loss, no matter how much he purchased.

"Manufacturers of the same product, under like conditions, took opposite sides on the question, suggesting the inference that if one manufacturer could get along without it, the other could. It was argued by the negative that if no manufacturers guaranteed prices, orders would be placed early regardless of it, in order to avoid delay in securing stocks in rush seasons.

"Just what influence the guarantee of prices has had on the recent flood of cancelled orders was not developed at this hearing, but it is well to consider what the effect may be on business in any line where regular trade practices are departed from to meet possible emergencies and which, when business again becomes normal, by custom may be continued."

Gets Trade-Mark Registered in Patent Office.

Peerless Tool Company, Chicago, Illinois, has secured United States Patent Office registration, under number 137,676, for the trade-mark reproduced herewith. The particular description of goods to which it is applied is lifting jacks, vises, wire stretchers, wrenches, post and stump pullers, and clamps. The Company claims use of this trade-mark since August 4, 1920.



Explains Reasons Why Stores Cut Prices.

No merchant cuts prices because he prefers to lose money, says *The Leader*, official organ of the Automotive Equipment Association.

His purpose is to make money. What he loses on the cut-price article he expects to make up somewhere.

Now there are two ways possible of making up the loss:

- (1) Charging extra profit on other articles.
- (2) Getting an increased volume of business—"drawing trade."

The first of these two ways is clearly disadvantageous to the public.

One customer gets a bargain; others pay excessive prices.

And the excessive prices must total up to more than the bargains; else the scheme wouldn't be worth while for the store-keeper.

The second way—price-cutting to get increased volume—has been defended as legitimate advertising.

But is it?

Obviously the price-cutting is done to create an impression—an impression that the store is cheaper than others—not only on the cut-price line but on other lines.

Quite generally this is a false impression. The store that sold everything at a loss would soon have to go out of business.

But the price-cutter contrives to create the impression.

He very often does this by trading on the reputation which a manufacturer has built up for his article.

Price-cutting is of no use unless it is done on a standard article which has a well-known standard price and is known to be worth it.

The price-cutter takes unfair advantage of the hard work done by that manufacturer.

By thus cutting the price for his own ulterior purposes, he tends to make the public believe that the article is not worth the standard price.

In the same way he unfairly competes with other

stores whose policy is to keep a fair, even level of honest prices on all goods all the time.

He makes these stores appear to be high-priced simply by being cheaper than they are on one or two articles of known value.

The price-cutter thus, by his so-called "advertising scheme," injures the manufacturer and his own competitors.

But he also injures the public, because

(1) He makes it difficult for the public to know clearly the real value of merchandise.

(2) He discourages manufacturers from trying to establish a fair, standard value.

(3) He undermines the reputable all-the-year-round stores which render real service to the buying public.

Gets Trade-Mark Registered in Patent Office.

Under number 131,054, The Yale and Towne Manufacturing Company, Stamford, Connecticut, has been granted United States Patent Office registration for the trade-mark shown herewith. The particular description of goods to



which it is applied is locks and parts thereof, screen door latch, secret gate catch, screen door catches, cupboard-turns, cupboard catches, mortise extension bolts, cupboard bolts, swing latches, and keys, screw sash fasteners, elbow catches, flush cupboard catches, flush extension bolts, flush bolts, lavatory bolts, chain bolts, inside door sets, chain door fasteners, transom catches, necked bolts, foot bolts, front door sets and store door sets.

The Company claims use of this trade-mark since 1902.

Are Glad to Spend Money for Subscription Renewal.

TO AMERICAN ARTISAN AND HARDWARE RECORD:

We herewith hand you \$2 for 1921 subscription. We are glad to spend our money that was, as of 40 trade papers that come to us few, if any, are more appreciated than yours.

Very truly,

VANDERVOORT HARDWARE CO.

Lansing, Michigan, December 1, 1920.

Gives Instructions for Making a Good Chisel.

Even for those who have no occasion to use them reliable instructions for making a good chisel are of benefit.

Hardware dealers who study the instructions, issued in pamphlet form by Joseph T. Ryerson and Son, Chicago, Illinois, are better equipped for intelligently selling such articles.

The instructions are as follows:

How to Make a Good Chisel.

A very large percentage of the chisels now in use are not good chisels. They are not forged, shaped and hardened in the best way to give long life and adequate service.

During the past few years we have secured valuable information from various chisel makers and users and pass it along in this booklet, believing that it will help you to turn out a tool far superior to those ordinarily furnished.

Considering the making of a chisel from $\frac{3}{4}$ inch Octagon Tool Steel, we suggest the following method:

Forging.

Cut off a length of steel, depending on the length of chisel desired, and heat up the end for 2 inches to a bright cherry red.

Trim off two opposite sides so as to form a very blunt nosed tool.

The object of this trimming is to do away with the danger of lapping when drawing out.

The horn of the anvil should be used in drawing out, inasmuch as this will have the least possible tendency to widen the piece, and therefore the minimum amount of "edging in" or hammering on the edge will be necessary.

The reason a chisel should not be hammered on the edge is that the grain of the steel will thereby be distorted or, as you might say, "crumpled up," and this always has a tendency to weaken any metal.

If in the final forging operation the chisel gets a little too wide, it can be very easily trimmed off on the emery wheel during the grinding operation.

Draw the chisel out so that it will be about $\frac{1}{8}$ inch thick at the end and about $\frac{3}{8}$ inch thick $1\frac{1}{4}$ inches back from the end.

The forging should be finished with light blows until the steel has *almost lost color*, but it absolutely must not be struck *after* the color has disappeared.

It is a good thing to reheat the steel to a dull red without using any blast, and give it a second hammering with light blows until the color has again almost disappeared.

The four important things to remember in forging a chisel are, therefore:

Draw out at a good cherry red heat, finish with light blows at a dull red heat, do not hammer after the color has disappeared, hammer *as little as possible on the edge* and then only when the steel is fairly hot.

Grinding.

Grind the chisel before you harden it, as you can grind faster in this way without the danger of drawing the temper.

Hardening and Tempering.

After the chisel has been ground to the desired shape, heat it to a dull cherry red color for about $2\frac{1}{2}$ inches from the end and quench it vertically in cold water to a depth of $1\frac{1}{4}$ inches, moving it up and down until no red color is left in any part of the steel.

The part which has been drawn out should now be polished with emery cloth and the temper drawn to a dark purple or a blue by holding the chisel over the fire or in a furnace.

Always draw a chisel a little more in winter than in summer.

We have suggested hardening the chisel back very much further than is usual.

The reason is that a chisel so made can be ground a great many times without redressing.

Inasmuch as grinding is cheap and redressing is expensive, considerable loss can thereby be avoided.

Trade-Mark for Camp Stoves and Ovens Is Registered.

United States Patent Office registration, under number 128,798 has been granted to The Red-E Company, Columbus, Ohio, for the trade-mark reproduced herewith. The drawing indicates the trade-mark as being red in color. The particular description of goods to which it is applied is camp stoves and ovens. The Company claims use of this trade-mark since March, 1916.

RED-E
128,798.

Patent Office Registration for Sleds Is Granted.

Under number 133,331, United States Patent Office registration has been granted to Sherwood Brothers Manufacturing Company, Incorporated, Canastota, New York, for the trade-mark herewith shown. Application for registration was filed June 5, 1920, and the Company claims use of this trade-mark since January 21, 1920. The particular description of goods to which it is applied is sleds.

STEEROPLANE
133,331.

Trade Opportunities in Foreign Lands.

The Bureau of Foreign and Domestic Commerce through its Special Agents, Consular Officers and Commercial Attachés, is receiving information of opportunities to sell hardware and kindred lines in several foreign countries. Names and locations will be supplied on request to the Bureau in Washington or its District Offices. Such requests should be made on separate sheets for each opportunity, stating the number as given herewith:

34170.—A commercial representative in Spain desires to secure an agency on commission for the sale of aluminum kitchen ware, hardware novelties, etc. Correspondence should be in Spanish or French. References.

34174.—An import agent in East Africa desires to be placed in communication with manufacturers with a view to securing the agency for the sale of wood-cutting tools, farm implements, etc. No reference offered.

34175.—A commission merchant in Turkey desires to enter into communication with firms with a view to securing agencies for the sale of tools, agricultural implements, etc. Catalogues and samples are requested. Correspondence should be in French. Reference.

34177.—A commercial agent in Belgium wishes to get in touch with a firm desirous of establishing an agency or branch sales office for the sale of its products in that country. No reference offered.

34179.—A manufacturing company in Spain desires to purchase and secure an agency for electrolytic copper wire bars with a guaranteed minimum combustibility of 98 to 99 per cent. Copper bars, which are for laminating, should weigh from 60 to 70 kilograms each. Copper blocks for laminating are also desired, and copper and brass in all forms, as well as tinplate, aluminum, white metal, etc. Quotations should be given c. i. f. Spanish port. Payment to be made against documents on arrival of goods. Correspondence should be in Spanish. References.

34180.—The representative of a firm in Spain is in the United States for a short time and desires to secure agencies for the sale of hardware. References.

34181.—A trading agency company in Argentina desires to secure the representation of firms for the sale of American goods, such as small articles in the hardware and other lines. Goods requested on consignment to be paid for cash against sales. References.

Coming Conventions.

Texas Hardware and Implement Association, Adolphus Hotel, Dallas, Texas, January 18, 19, and 20, 1921. A. M. Cox, Secretary, 1808 Main Street, Dallas, Texas.

Western Retail Implement Vehicle and Hardware Association, Kansas City, January 18, 19 and 20, 1921. H. J. Hodge, Secretary, Abilene, Kansas.

Pacific Northwest Hardware and Implement Association, Seattle, Washington, January 18, 19, 20 and 21, 1921. E. E. Lucas, Secretary, Hutton Building, Spokane, Washington.

Missouri Retail Hardware Association, Planters Hotel, St. Louis, Missouri, January 25, 26 and 27, 1921. F. X. Erer, Secretary, 5106 North Broadway, St. Louis, Missouri. Becherer, Secretary, 5106 North Broadway, St. Louis, Missouri.

Mountain States Hardware and Implement Association, Brown Palace Hotel, Denver, Colorado, January 25, 26, 27, 1921. W. W. McAllister, Secretary-Treasurer, Boulder, Colorado.

Indiana Retail Hardware Association, Athenaeum Hall, Indianapolis, Indiana, January 25, 26, 27 and 28, 1921. G. F. Sheedy, Secretary, Argos, Indiana.

Oregon Retail Hardware and Implement Dealers' Association, Portland, Oregon, January 25, 26, 27 and 28, 1921. E. E. Lucas, Secretary, Hutton Building, Spokane, Washington.

Kentucky Hardware and Implement Dealers' Association, Louisville, Kentucky, January 25, 26, 27 and 28, 1921. J. M. Stone, Secretary, Sturgis, Kentucky.

American Society of Heating and Ventilating Engineers, Philadelphia, Pennsylvania, January 27, 27 and 28, 1921. Casin W. Obert, Secretary, 29 West 39th Street, New York City.

West Virginia Retail Hardware Dealers' Association, Huntington, West Virginia, February 1, 2, 3, 1921. James B. Carson, Secretary-Treasurer, Dayton, Ohio.

Nebraska Retail Hardware Association, Hotel Rome, Omaha, Nebraska, February 1, 2, 3 and 4, 1921. George H. iDetz, Secretary, Lincoln Nebraska.

Sheet Metal Contractors' Association of Indiana, February 2, 3 and 4, 1921, Indianapolis, Indiana. Ralph R. Reeder, Secretary, 314 East Sixteenth Street, Indianapolis, Indiana.

Wisconsin Retail Hardware Association, Milwaukee, Wisconsin, February 2, 3 and 4, 1921. P. J. Jacobs, Secretary, Stevens Point, Wisconsin.

Oklahoma Hardware and Implement Association, Oklahoma City, February 8, 9 and 10, 1921. W. B. Porch, Secretary-Treasurer, Oklahoma City, Oklahoma.

The Michigan Retail Hardware Association, Grand Rapids, Michigan, February 8, 9, 10 and 11, 1921. Arthur J. Scott, Secretary, Marine City, Michigan.

North Dakota Retail Hardware Association, Fargo, North Dakota, February 8, 9, 10 and 11, 1921. C. N. Barnes, Secretary, Grand Forks, North Dakota.

Pennsylvania and Atlantic Seaboard Hardware Association, Incorporated, Convention and Exhibition, Philadelphia Commercial Museum, Philadelphia, February 8, 9, 10, 11, 1921. Sharon E. Jones, Secretary, 1314 Fulton Building, Pittsburgh.

Illinois Retail Hardware Association, Hotel Sherman, Chicago, Illinois, February 15, 16 and 17, 1921. Leon D. Nish, Secretary, Elgin, Illinois.

California Retail Hardware and Implement Association, San Francisco, California, February 15, 16 and 17, 1921. LeRoy Smith, Secretary, 112 Market Street, San Francisco, California.

Minnesota Retail Hardware Association, St. Paul Auditorium, St. Paul, Minnesota, February 15, 16, 17, 18, 1921. H. O. Roberts, Secretary, Metropolitan Life Building, Minneapolis, Minnesota.

Ohio Hardware Association, Columbus, Ohio, February 15, 16, 17 and 18, 1921. Hotel Headquarters, Deshler Hotel, Exhibition in Memorial Hall. James B. Carson, Secretary, Dayton, Ohio.

New England Hardware Dealers' Association, Mechanics' Building, Boston, Massachusetts, February 21, 22 and 23, 1921. George A. Fiel, Secretary, 10 High Street, Boston, Massachusetts.

Michigan Sheet Metal Contractors' Association, Hotel Durant, Flint, Michigan, February 22, 23 and 24, 1921. F. E. Ederle, Secretary, 1121 Franklin Street, S. E., Grand Rapids, Michigan.

Iowa Retail Hardware Association, Savery Hotel, Des Moines, Iowa, February 22, 23, 24 and 25, 1921. A. R. Sale, Secretary-Treasurer, Mason City, Iowa.

New York State Retail Hardware Association, Rochester, New York, February 22, 23, 24 and 25, 1921. John B. Foley, Secretary, 607 City Bank Building, Syracuse, New York.

South Dakota Retail Hardware Association, Sioux Falls, South Dakota, February 22, 23, 24, 25, 1921. H. O. Roberts,

Secretary, Metropolitan Life Building, Minneapolis, Minnesota.

National Warm Air Heating and Ventilating Association, Cleveland, Ohio, April 19 and 20, 1921. Allen W. Williams, Secretary, Columbia Building, Columbus, Ohio.

Panhandle Hardware and Implement Association, Amarillo, Texas, May 8, 9 and 10, 1921. Troy Thompson, Secretary-Treasurer, Dalhart, Texas.

Hardware Association of the Carolinas, Charlotte, North Carolina, May 10, 11, 12 and 13, 1921. T. W. Dixon, Secretary-Treasurer, Charlotte, North Carolina.

Southeastern Retail Hardware and Implement Association (composed of Alabama, Florida, Georgia and Tennessee), Atlanta, Georgia, May 17, 18, 19 and 20, 1921. Walter Harlan, Secretary, 701 Grand Theater Building, Atlanta, Georgia.

Retail Hardware Doings.

Arkansas.

Joe Butz and Son purchased the Goech Hardware Store on Spring Street at Eureka.

Iowa.

W. H. Hutchinson sold his interest in the hardware business at Manchester to Henry Pettlon.

F. G. Kuester, engaged in the hardware business in Lyman for a number of years, will start a closing out sale soon.

Kansas.

Grover Beatty has disposed of his hardware and implement business at Pleasanton to Melton and Eldeman of Eldorado Springs, Missouri.

The Gray Hardware and Implement Company will soon have a big stock reducing sale of their entire stock at St. John.

Robert Stoehr has purchased the interest of John Humbolt in the Burdock Hardware and Implement Company at Cheney and will continue business under the old name.

J. S. Frechorn has sold his hardware and implement business at Miltonvale to Edward P. Gathers of Maple Hill, who will take charge January 1st.

Lee J. Gath is now in the hardware and implement business at Eoff, having purchased the Kelly store from William M. Kings.

A. B. Carpenter has sold his stock of furniture and hardware at Mulberry to Valentine Mendichi, of Burgrass.

George Kaup has moved his implement store from North Morgan Avenue to the Butler barn west of Griffiths and Son's grocery at Downs.

F. J. Hollis is again owner of the Singleton building, occupied by Cantrall & Wilever hardware store, at Fredonia. Mr. Hollis sold a half interest to C. A. Singleton.

Minnesota.

L. Q. Bergan bought a hardware store at Willmar.

August Trends sold his interest in the hardware business at Foley to his partner, Frank Pokladnik.

Hilstad & Kitzinger sold their hardware business at Kenyon to Ole Thoen and Oscar Jorstad.

Appert Hardware and Implement Company at St. Cloud have changed their firm name to the East Side Hardware Company.

F. M. Breher is erecting an addition to his hardware store at Wadena.

Missouri.

Parrish and Son moved their hardware store to their own building two doors north of the Post Office at Hamilton.

Nebraska.

H. A. Hotchkiss has become the new owner of the Skillman and Company Hardware store at Long Pine.

The C. B. Smith Hardware Company of Bartley sold their stock of hardware, stoves, etc., to J. J. Gragg of McCook.

T. M. Shoaff and Son are moving their implement stock into the building they purchased some time ago, located south of the I. O. O. F. Hall at Fullerton.

North Dakota.

R. F. Donohower sold his hardware store at Lidgerwood to S. J. Livingood.

R. D. Shaw sold his hardware business to Dahl Brothers at Rhame.

Ohio.

Fremont Hardware Company has been incorporated with a capital of \$40,000 at Fremont by O. E. Scarlet, C. S. King, and H. W. Johnston.

Texas.

Fort White Fox Company of Dalhart changed their firm name to the Fox Hardware Company.

Wisconsin.

C. T. Mueller and Son sold their hardware store at Marshfield to J. L. Putman.

Selling Automotive Accessories

How Hardware Dealers Can Increase Their Profits by Handling Standardized Automotive Accessories. Facts and Suggestions to Aid Them in Giving Better Service.

SCHOOLS ARE URGED TO TEACH THE RULES OF THE ROAD.

Inclusion of courses designed to teach children the "Rules of the Road" will be urged upon school officials throughout the United States by the textbook committee of the Highway and Highway Transport Education Committee of the Bureau of Education.

While it is yet too early to say definitely what the recommendations for these courses will contain, some indication can be obtained from studies which are already under way in the Detroit public schools, as well as in some others.

In Detroit, for example, the work starts with the kindergarten, where the child is taught to exercise care in crossing streets, always waiting on the corner until he is sure that nothing is approaching within a half block.

Later, as the child progresses to the elemental grades, the course is broadened and the element of personal responsibility enters into the course, together with more detailed instructions as to the rules of safety, always in language which is easily understood and which is confined to fundamental principles.

Gets Trade-Mark Registered for Spark Plugs.

Under number 121,888, United States Patent Office registration has been granted to the Champion Ignition Company, Flint, Michigan, for the trade-mark depicted herewith. No claim is made for the word

TRACTOR
121,888.

"Tractors" except in the particular manner in which it appears in the accompanying drawing. The particular description to which it is applied is spark plugs and parts thereof. The Company claims use of this trade-mark since May, 1919.

Tires Should Be Deflated After 2,500 Miles.

Part of the service of the dealer in automotive accessories should include practical advice on the care of the tires which he sells.

After driving a new car approximately a thousand miles, the wise motorist will drain all the oil out of his engine, give it a thorough cleaning and refill with fresh oil.

This operation should be repeated every thousand to fifteen hundred miles' service to clean out all particles of metal, grit and sediment that may have accumulated.

Tires deserve similar treatment to preserve their life and enable them to give maximum mileage.

At the end of every 2,500 miles' service a tire should be deflated, dismounted, soapstone and grit removed, and the inside of the casing washed with gasoline.

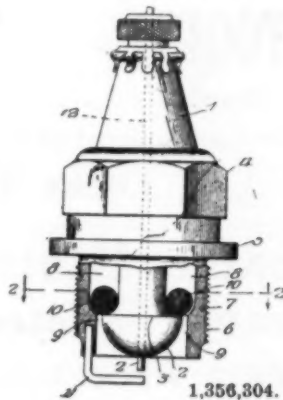
After drying, the inside should be dusted with talc, the tire mounted and the tube charged with fresh air.

During this operation a close inspection should be made of the tread for cuts and fragments of glass.

The rims should be cleaned of rust and painted.

Assigns United States Patent Rights for Spark Plug.

Hubert A. Myers, Toledo, Ohio, assignor to The Myers Spark Plug Company, Toledo, Ohio, a Corporation of Ohio, has secured United States patent rights, under number 1,356,304, for the spark plug described as follows:



A spark plug comprising an insulator having an enlarged lower end portion forming a shoulder, with space around that portion of the insulator above the shoulder, and a plurality of loose elements adapted to move around in said space, which elements normally rest upon said shoulder, the plug having a restricted inlet extending around the edge of said shoulder to admit the pressure against the lower sides of said elements.

Select Oil by Mileage, Not by Age of Car.

Most oiling charts base their recommendations upon the make and model of the car, disregarding the mileage which that particular car has traveled.

But a new and more logical scheme of lubricant recommendations has appeared, according to *Motor Life*.

One of the leading oil refining companies has developed a comprehensive chart whereby the old and misleading ideas of lubricant recommendations are discarded for a really scientific method of determining the grade by the use which the car has had.

If a car is new, it requires the light grade. If it has run 3,000 to 5,000 miles, it takes the medium grade. If it has traveled 15,000 to 20,000 miles it needs the heavy grade.

The logic of this is quite obvious. It stands to reason that, if the bearing surfaces are loose fitting, a different grade of lubricant is required than if they are less worn.

Advertising Help and Comment

Send Us Copies of Your Advertisements. Let Us Help You Get Bigger Results by Advice and Suggestions. The Service Is Free. Don't Hesitate to Take Advantage of It.

In order to be helpful, criticism must be constructive.

It is easy to find fault.

Moreover, there is a certain deadly facility in our makeup by which we glide imperceptibly into the habit of hunting for flaws and ignoring virtues.

Much of the fault-finding comes

Naturally, therefore, he fails at times to embody values and proportions which would enhance the thing he has done.

This applies to every kind of human endeavor—whether it be a book, a house, or an advertisement.

There are positive values in the advertisement of N. M. Holden and

Brother announce "Keys Made, Locks Repaired," shows that they have a service in their business which will be appreciated by customers.

When this advertisement appeared, the coal man had very little to say in the affairs of Philadelphia. It was summer.

In brief terms it defines and suggests a picture of ample stock and kindly service.

Taken by itself, without reference to other advertisements of the same store, it may be open to the objection that it is too general in its statements and that it does not call attention to particular things nor give actual prices.

This objection is valid only if it is the custom of N. M. Holden and Brother to use a similar style of composition in all their publicity.

On the other hand, if they are in the habit of running advertisements of particular commodities or groups of commodities with descriptions and prices, then this advertisement has a legitimate mission of its own.

In that case it serves to create a general impression of N. M. Holden and Brother as a hardware institution.

In this view of the matter there is no justification for fault finding as to the advertisement here under consideration.

* * *

Don't Blow Your Own Horn Too Loudly.

The only people who really enjoy the use of the personal pronoun are lovers and honeymooners.

They never tire of hearing: "You" and "I."

But the people who may buy your goods do not care a seventeenth part of a cucumber for the "we" or the "us" when you use those pronouns about yourself.

They are not interested in your profits.

They want to know what you are going to do for them in the line of service and dependable merchandise.

N. M. Holden & Bro.

The Hardware Store

TOOLS!

Starrett's

TOOLS!

Stanley

TOOLS!

Yankee

We have a good stock and our prices are right.

Keys Made

Locks Repaired

Seasonable Hints

Nursery Refrigerator Water Coolers

Ice Cream Freezers

WATER COOLERS

SCREENS

Prompt Attention given Mail Orders.

Bell 'phone—Fkd. 95.

Keystone—East 445.

We Aim to Please.

Quick Service.

Open Friday and Saturday Evenings

4325-27 FRANKFORD AVENUE, Frankford.

Call us on either 'phone.

Goods Delivered.

from failure to understand and analyze the qualities of the thing condemned.

A man may have spent hours and days in preparing some work.

No matter what its imperfections may be, he has put something of himself into the work.

However inadequately it may have been done, he has transmuted into it a part of his own spirit.

Of course, he is too close to his own product to get the proper perspective.

Brother, which is herewith reproduced in its original size from the *Frankford Gazette*, Frankford, Philadelphia, Pennsylvania.

N. M. Holden and Brother connect their statement of tools with three leading brands of national fame.

This is supplemented by the information that a good stock is on hand and that the prices are right.

Some hardware stores do not do lock repairing and key making.

The fact that N. M. Holden and

A New Basis for Rating and Comparing Warm Air Furnaces Over Their Entire Range of Operation.

A Discussion of Some Recent Results Obtained in the Warm Air Furnace Research Work at the University of Illinois.

Written for AMERICAN ARTISAN AND HARDWARE RECORD by A. C. Willard, Professor Heating and Ventilation and Head of Department of Mechanical Engineering, University of Illinois.

One of the principal objects of the cooperative research program of the National Warm Air Heating and Ventilating Association, now being carried out at the University of Illinois, has been the development of a method of rating and comparing two or more furnaces over a wide range of operating conditions.

The Importance of Rating a Furnace Over a Wide Range.

The research staff has given this matter much thought, in the attempt to get a comprehensive method of expressing the capacity, efficiency and other char-

acteristics of a given warm air furnace with a steam heating boiler or a hot water heater.

Such information as this has long been desired, but has never before been obtainable. It represents, probably, the most important single result of the Warm Air Furnace Research Investigation.

It means that the warm air furnace manufacturer will be able to publish as definite engineering data concerning his equipment as any maker of steam or hot water heating boilers can possibly issue in these closely allied fields.

In fact, very few makers of steam and hot water heating equipment possess such complete data as is represented by these results.

As a result of such tests as those shown here, the performance curves of a warm air furnace can be drawn as definitely as the so-called "characteristic curves" of an electric motor, steam engine, steam turbine or pump.

Performance Data Based on a Series of Actual Tests.

Typical results in the shape of performance curves (Figure 1) are given for one series of recent tests on a pipeless furnace.

Since the final data from any portion of this research work is not released by the University of Illinois and the National Warm Air Heating and Ventilating Association until it is published as a Bulletin of the Engineering Experiment Station, the dimensions and description of the furnace are purposely withheld.

Complete data will, however, be reported at the annual meeting of the Association. It is sufficient to say the curves are based on actual tests of commercial apparatus, and are used in this discussion to illustrate a new method of testing, rating and comparing warm air furnaces for the benefit and information of the furnace industry as a whole.

The Essential Factors in Obtaining Performance Curves.

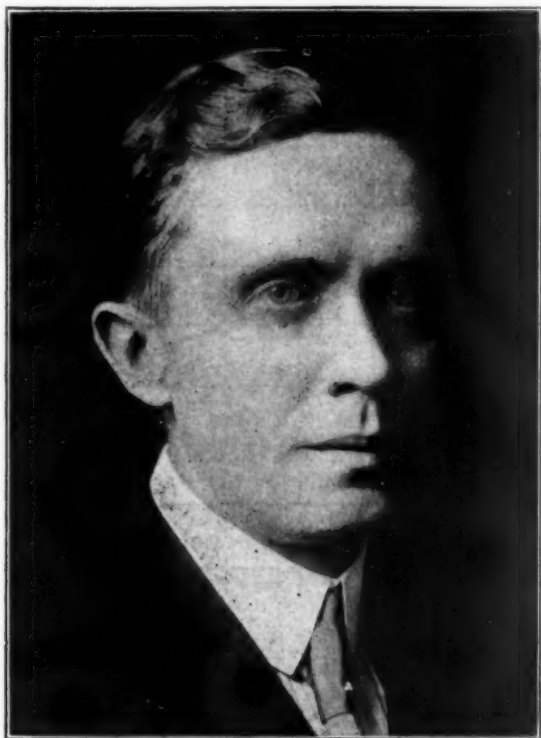
The tests on which these curves are based were all run on the same pipeless furnace to determine the following factors, all of which are essential to the proper design and installation of a furnace (pipeless or piped):

(a) Rate of combustion (pounds of coal burned per square foot of grate per hour).

(b) Efficiency of the furnace (ratio of heat put into air passing furnace to total heat value of coal burned, usually expressed as a percentage).

(c) Capacity of furnace in B.t.u. per hour (British thermal units), which is the heat put into air passing furnace.

(d) Equivalent register temperature of air leaving register based upon a 65 degree Fahrenheit inlet temperature. To get actual rise in temperature it is only necessary to subtract 65 from these temperature values.



Professor A. C. Willard, Mechanical Professor Heating and Ventilation and Head of Department of Engineering, University of Illinois.

acteristics of a warm air furnace over its complete range of operation.

With positive and accurate means of measuring the amount of air handled and determining the correct rise in air temperature, it is now possible to study the performance of a warm air furnace with definiteness.

Performance Data Easily Shown in the Form of Curves.

Recent tests under the immediate supervision of Professor A. P. Kratz and Mr. V. S. Day of the Engineering Experiment Station show that it is entirely feasible to represent this data for any given furnace by a series of simple curves which tell the whole story of furnace operation almost at a glance.

With this information before him, the engineer, heating contractor, or architect can not only compare warm air furnaces of different types and makes, but he

(e) The draft at the smoke outlet of the furnace in inches of water, which indicates the great importance of providing a satisfactory chimney if the full capacity of the furnace is to be realized. It also shows that *capacity is entirely dependent on draft for a given furnace and a given coal.*

In addition to the above factors, much additional data, such as CO_2 content and flue gas temperature, was determined but as it is not introduced into this discussion it has been omitted from this list of factors.

What the Curves Show.

An inspection of Figure 1 will show that the performance of the furnace tested is completely shown

the combustion rate axis at the bottom, and by reading to the right or left as indicated by the arrows, the following rating and performance data is obtained:—

1. Efficiency = 64 per cent.
2. Heating capacity = 120,000 British thermal units per hour.
3. Equivalent outlet register temperature = 202 degrees Fahrenheit.
4. Draft in inches of water = 0.085.
5. Rate of combustion = 5.6 pounds per square foot of grate per hour.

The heating capacity just found (120,000 British thermal units per hour) is not the maximum capacity

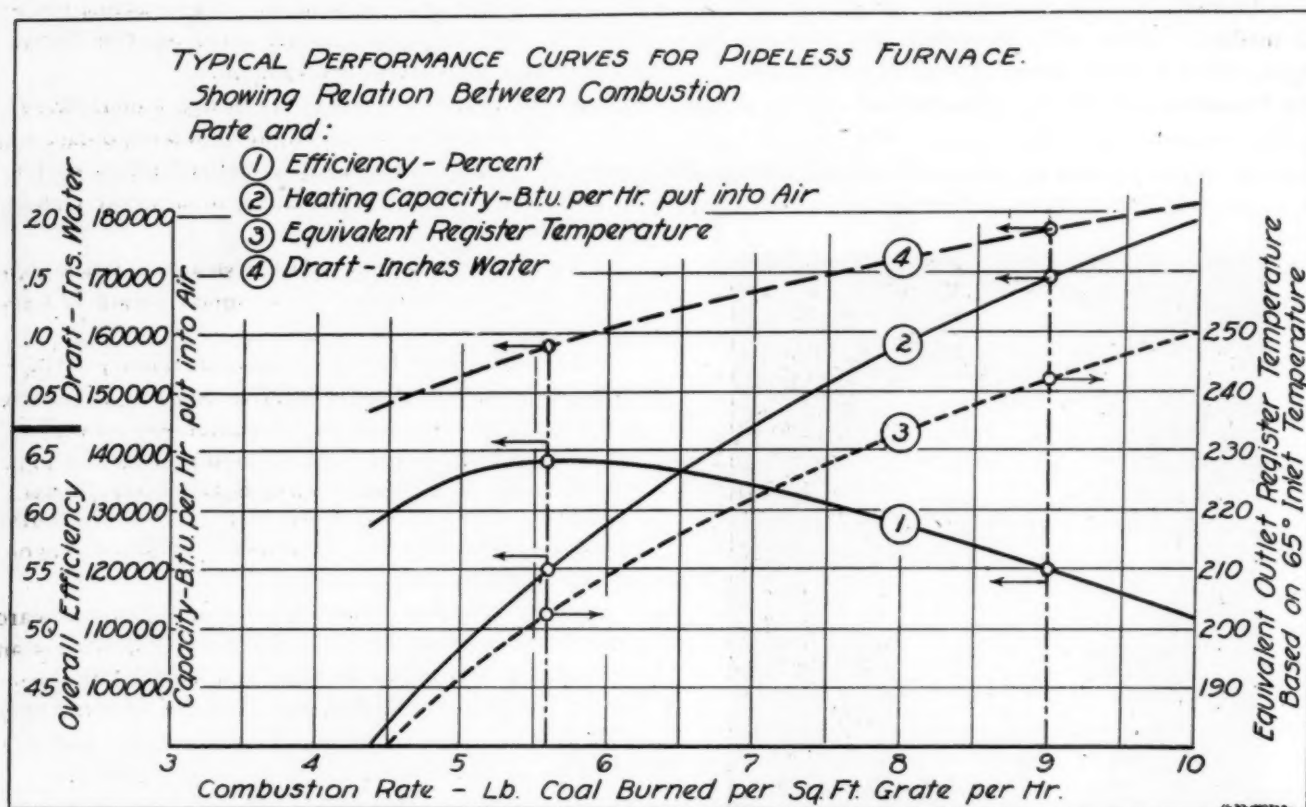


Figure 1.

for all combustion rates between 4.5 pounds and 10 pounds per square foot of grate per hour.

The combustion rates are indicated along the horizontal line at the bottom of the figure. Five tests were run at five different rates of combustion and the results from each test plotted against the corresponding combustion rate at the bottom of the chart.

It was then found possible to draw smooth curves through these points and these curves have been numbered and labeled as:

1. Efficiency in percent.
2. Heating capacity in British thermal units per hour.
3. Equivalent outlet register temperature based on a 65-degree inlet temperature.
4. Draft in inches of water at smoke outlet.

After the curves are drawn, it is a simple matter to ascertain under what conditions this furnace will develop its maximum efficiency.

To do this, draw a vertical line (shown dot and dash in figure) through the highest point of the efficiency curve (1).

This line will cut all the other curves, as well as

of this furnace by any means, but it is the capacity at maximum efficiency.

The heating capacity of this same furnace can be increased nearly 50 per cent if the chimney draft can be approximately doubled.

By increasing the draft to 0.18 inches it is possible to burn coal at the rate of 9 pounds per square foot of grate and the rating and performance data becomes (see vertical dot and dash line at 9 pounds):—

1. Efficiency = 55 per cent.
2. Heating capacity = 169,000 British thermal units per hour.
3. Equivalent outlet register temperature = 242 degrees Fahrenheit.
4. Draft in inches of water = 0.18.
5. Rate of combustion = 9 pounds per square foot of grate per hour.

The significance of this method of showing rating and performance data is of the greatest value in determining upon the selection of the proper furnace or in comparing two furnaces or a furnace and a boiler.

Assume the heat loss from a certain house is 170,000 British thermal units per hour in the very coldest

weather, which lasts for only a few hours, and that the heat loss under average cold weather conditions which last for many hours is only about two-thirds of this or 113,000 British thermal units.

It will be at once apparent that this furnace will handle the average cold weather load at very nearly its highest efficiency, which the efficiency curve showed to be 64 per cent at about this same rating.

This same furnace, as shown by the rating and performance curves, has a heating capacity of 169,000 British thermal units when burning coal at a combustion rate of 9 pounds per square foot of grate with a draft of 0.18 inches of water.

It would also, therefore, readily handle the severest heating load during this winter, *provided the chimney in this house could develop a draft of 0.18 inches of water.*

This furnace would, of course, be operating in the latter case at an efficiency of only 55 per cent with an outlet register temperature of 242 degrees Fahrenheit as shown by the curves at 9 pounds combustion rate.

This reduced efficiency and high register temperature is not a serious matter, however, as the very severe conditions referred to only last a few hours.

It should be noted that in the example just discussed not only has the register temperature increased from 202 degrees to 242 degrees Fahrenheit, but the weight and volume of air passing the furnace has also increased greatly.

The curves can readily be made to show the amount

of air handled, as well as the temperature of the air leaving outlet register.

If it is desired to compare this furnace with a steam heating boiler operating at the same combustion rate, it is only necessary to fix the combustion rate in order to make the comparison.

Refer to the rating curves and take nine pounds on the horizontal axis as the index point.

The heating capacity as already found is 169,000 British thermal units per hour, which is equal to $169,000 \div 250 = 680$ square feet of steam radiation. (Each square foot of standard steam radiation transmits 250 British thermal units per hour.)

Now a steam boiler large enough to supply 680 square feet of radiation would need to have a rating of 25 per cent more than this, to allow for mains and branches, or 850 square feet.

The pipeless furnace requires no allowances for piping connections and the capacity curve shows practically its **true heating** capacity over its entire range of operation.

It must be made very plain that only a small amount of the data obtained in the tests referred to in this discussion have been presented here.

A much more complete set of curves is kept of all such rating tests by the Warm Air Furnace Research Staff at Urbana.

The essential operating characteristics of a warm air furnace are very fully shown, however, by the four curves which have been considered in this discussion.

Cooperative Investigation of Warm Air Furnaces and Furnace Heating Systems at the University of Illinois.

Written for AMERICAN ARTISAN AND HARDWARE RECORD by A. C. Willard, Professor Heating and Ventilation and Head of Department of Mechanical Engineering, University of Illinois.

This work is being conducted under a co-operative agreement between the National Warm Air Heating and Ventilating Association and the Engineering Experiment Station of the University.

It involves the determination of the efficiencies and capacities of warm air furnaces, and a study of the proper conditions of installation and operation so that furnaces may be accurately rated and properly selected to do the work required.

This investigation has been in active progress since October, 1918, and the equipment employed is located in the Mechanical Engineering Laboratory of the University, where the equivalent of a three story house has been erected and equipped with a complete furnace heating system.

In addition to this a pipeless furnace plant has also been installed and equipped for testing.

The principal problem involved in this research has been to determine accurately the amount of air flowing through the system when the furnace is operating under its own motive head as in an actual installation.

Special calibrating apparatus has been developed in solving this problem so that when the inlet and outlet velocities are measured in the main plant the condi-

tions of measurement can be duplicated in the two calibrating plants and the reading of all instruments checked for accuracy at any time.

In addition to this, the correct measurement of the air temperatures throughout such a system has presented a very difficult problem, which is also being studied by the use of an elaborate system of thermocouples.

More or less auxiliary equipment for studying the proper shape and size of leaders and stacks and the effect of covering same has been erected and is now in operation.

Some of this equipment has been used in determining the heat losses from bare and covered leaders and casings.

A permanent staff of at least three men is constantly employed on this work toward which the furnace manufacturers of the country contribute about \$8,000.00 a year, in addition to the supervision, testing instruments and other facilities provided by the University.

An illustrated report of progress, issued as Bulletin No. 112, and a second report on the "Emissivity of Heat from Various Surfaces," Bulletin No. 117, have already been published by the Engineering Experiment Station. These publications are now available.

(e) The draft at the smoke outlet of the furnace in inches of water, which indicates the great importance of providing a satisfactory chimney if the full capacity of the furnace is to be realized. It also shows that *capacity is entirely dependent on draft for a given furnace and a given coal.*

In addition to the above factors, much additional data, such as CO_2 content and flue gas temperature, was determined but as it is not introduced into this discussion it has been omitted from this list of factors.

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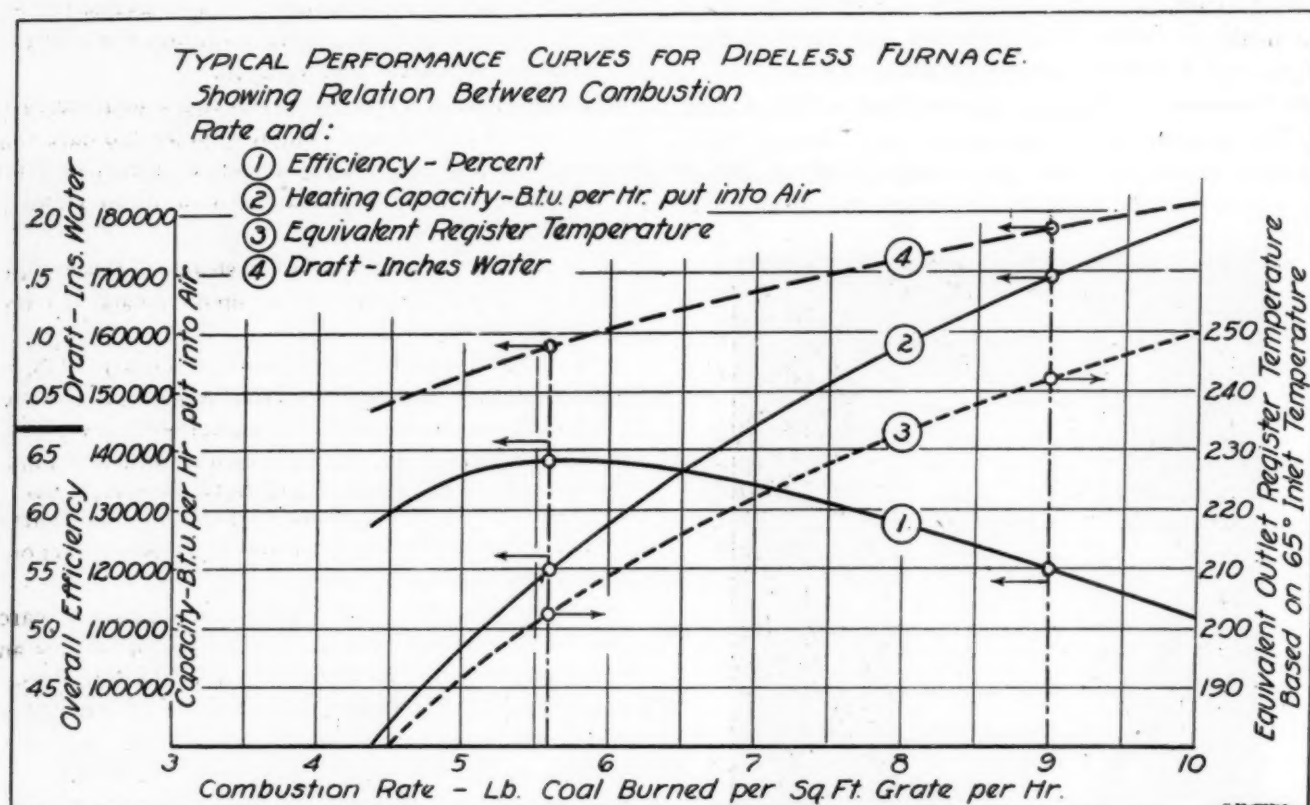


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This line will cut all the other curves, as well as

of this furnace by any means, but it is the capacity at maximum efficiency.

The heating capacity of this same furnace can be increased nearly 50 per cent if the chimney draft can be approximately doubled.

By increasing the draft to 0.18 inches it is possible to burn coal at the rate of 9 pounds per square foot of grate and the rating and performance data becomes (see vertical dot and dash line at 9 pounds):—

1. Efficiency = 55 per cent.
2. Heating capacity = 169,000 British thermal units per hour.
3. Equivalent outlet register temperature = 242 degrees Fahrenheit.
4. Draft in inches of water = 0.18.
5. Rate of combustion = 9 pounds per square foot of grate per hour.

The significance of this method of showing rating and performance data is of the greatest value in determining upon the selection of the proper furnace or in comparing two furnaces or a furnace and a boiler.

Assume the heat loss from a certain house is 170,000 British thermal units per hour in the very coldest

weather, which lasts for only a few hours, and that the heat loss under average cold weather conditions which last for many hours is only about two-thirds of this or 113,000 British thermal units.

It will be at once apparent that this furnace will handle the average cold weather load at very nearly its highest efficiency, which the efficiency curve showed to be 64 per cent at about this same rating.

This same furnace, as shown by the rating and performance curves, has a heating capacity of 169,000 British thermal units when burning coal at a combustion rate of 9 pounds per square foot of grate with a draft of 0.18 inches of water.

It would also, therefore, readily handle the severest heating load during this winter, *provided the chimney in this house could develop a draft of 0.18 inches of water.*

This furnace would, of course, be operating in the latter case at an efficiency of only 55 per cent with an outlet register temperature of 242 degrees Fahrenheit as shown by the curves at 9 pounds combustion rate.

This reduced efficiency and high register temperature is not a serious matter, however, as the very severe conditions referred to only last a few hours.

It should be noted that in the example just discussed not only has the register temperature increased from 202 degrees to 242 degrees Fahrenheit, but the weight and volume of air passing the furnace has also increased greatly.

The curves can readily be made to show the amount

of air handled, as well as the temperature of the air leaving outlet register.

If it is desired to compare this furnace with a steam heating boiler operating at the same combustion rate, it is only necessary to fix the combustion rate in order to make the comparison.

Refer to the rating curves and take nine pounds on the horizontal axis as the index point.

The heating capacity as already found is 169,000 British thermal units per hour, which is equal to $169,000 \div 250 = 680$ square feet of steam radiation. (Each square foot of standard steam radiation transmits 250 British thermal units per hour.)

Now a steam boiler large enough to supply 680 square feet of radiation would need to have a rating of 25 per cent more than this, to allow for mains and branches, or 850 square feet.

The pipeless furnace requires no allowances for piping connections and the capacity curve shows practically its true heating capacity over its entire range of operation.

It must be made very plain that only a small amount of the data obtained in the tests referred to in this discussion have been presented here.

A much more complete set of curves is kept of all such rating tests by the Warm Air Furnace Research Staff at Urbana.

The essential operating characteristics of a warm air furnace are very fully shown, however, by the four curves which have been considered in this discussion.

Cooperative Investigation of Warm Air Furnaces and Furnace Heating Systems at the University of Illinois.

Written for AMERICAN ARTISAN AND HARDWARE RECORD by A. C. Willard, Professor Heating and Ventilation and Head of Department of Mechanical Engineering, University of Illinois.

This work is being conducted under a co-operative agreement between the National Warm Air Heating and Ventilating Association and the Engineering Experiment Station of the University.

It involves the determination of the efficiencies and capacities of warm air furnaces, and a study of the proper conditions of installation and operation so that furnaces may be accurately rated and properly selected to do the work required.

This investigation has been in active progress since October, 1918, and the equipment employed is located in the Mechanical Engineering Laboratory of the University, where the equivalent of a three story house has been erected and equipped with a complete furnace heating system.

In addition to this a pipeless furnace plant has also been installed and equipped for testing.

The principal problem involved in this research has been to determine accurately the amount of air flowing through the system when the furnace is operating under its own motive head as in an actual installation.

Special calibrating apparatus has been developed in solving this problem so that when the inlet and outlet velocities are measured in the main plant the condi-

tions of measurement can be duplicated in the two calibrating plants and the reading of all instruments checked for accuracy at any time.

In addition to this, the correct measurement of the air temperatures throughout such a system has presented a very difficult problem, which is also being studied by the use of an elaborate system of thermocouples.

More or less auxiliary equipment for studying the proper shape and size of leaders and stacks and the effect of covering same has been erected and is now in operation.

Some of this equipment has been used in determining the heat losses from bare and covered leaders and casings.

A permanent staff of at least three men is constantly employed on this work toward which the furnace manufacturers of the country contribute about \$8,000.00 a year, in addition to the supervision, testing instruments and other facilities provided by the University.

An illustrated report of progress, issued as Bulletin No. 112, and a second report on the "Emissivity of Heat from Various Surfaces," Bulletin No. 117, have already been published by the Engineering Experiment Station. These publications are now available.

Sells and Installs Five Hundred Warm Air Heaters in One Year.

For every three working days during 1920, The Schmidlin Brothers Company in Toledo, Ohio, installed five warm air heaters in that city and vicinity.

That is quite a mark to shoot at, and yet Carl Schmidlin, who is president and treasurer of the Company, says that he expects to better the record and make at least two installations a day during the year of 1921.

This record is even more remarkable when it is considered that each sale was made on the basis of service and not on price, for the Company sells only at one



Carl Schmidlin.

price for any certain type of warm air heater, and makes a special point of emphasizing the quality of the installation.

How do they do it?

The Company came into existence only three years ago, so they had to make a reputation.

Neither Carl Schmidlin nor his brother Dan, who is vice-president and secretary, knew much of anything about the warm air heating business, except as users of them in their homes, for Carl was a bookkeeper, and Dan was counting money in a bank up to 1917.

But they have built up an excellent organization, both for the office and shop and for the installation end of their business. Carl is the buyer and office head, Dan has charge of the sales and advertising, while the technical work is under the charge of Frank Meyers, who is one of the best known practical warm air heating engineers in Northern Ohio.

In the fall they have exhibits at every county fair within fifty miles of Toledo, and they advertise in more than a score of the rural newspapers in that section, so it is only natural that when a farmer thinks of putting in a warm air heater he thinks of The Schmidlin Brothers Company in the same breath.

The Schmidlin Brothers Company recently completed a large job of three furnaces in a bank with a fan system under the engineering direction of Mr. Meyers. About a week ago they finished two more installations nearly as large.



Dan Schmidlin.

When a "prospect" is located, his home is inspected as soon as possible; a real plan of installation is placed before him and a definite price set on the job. Seldom, if ever, is there any argument about price, because the prospect is so thoroughly "sold" on the matter of quality and service that even if he at first had a lower figure in mind, he sees the advantage of having the installation done in the best possible manner.

After the sale is made comes the most important part of the job—the installation, and here the two brothers have the "good fortune," or rather good judgment, of having two foremen in their employ who know "Installation" from beginning to end. One of them looks after the shop work; the making of the ducts, the boxes for registers, etc. The other supervises the actual installation and sees that everything is properly done; that the heater is placed to the best advantage; that the pipes are joined in the right manner; that the register boxes are thoroughly fitted and that the ducts are suitably covered at the joints, etc.

So when the job is completed, both the customer and the Company know that it is well done, which naturally helps to make new prospects.

In an organization officered by men who had their early training with figures, it is only reasonable to expect an up-to-date system of bookkeeping, so that at any time it can be ascertained quickly just how far a job has progressed; how much labor has been spent on it; how much invested in material; how much profit there will be in the completed job, after all charges for unproductive labor and other overhead items have been deducted.

The Company occupies a building 410-414 Orange Street, 55 feet wide and 65 feet deep, with a basement where the stocks of the heavier items are stored, while the lighter ones are carried on a balcony running 40 feet along the right side of the shop and all the way across in the center.

Among the heaters carried is the well known line of R. J. Schwab and Sons Company's Gilt Edge.

Three light trucks are kept busy delivering and bringing in material for the twenty workmen who are employed in the shop and on outside work. Two automobiles are kept equally busy in the sales department.

Hess-Snyder Company Holds Price in Line with Cost.

By F. H. Snyder, Secretary-Treasurer of the Hess-Snyder Company.

We are trying to keep our costs as low as we possibly can, and are adding to this cost a legitimate margin of profit, and in so doing, establishing our dealers' prices. As soon as we can lower these prices it is our desire doing so.

It is a common practice with many concerns to establish prices contingent upon the old law of supply and demand. If every concern would do as we are aiming to do, prices would then always be in line with the cost of production.

We have had throughout the entire year 1920 more furnace business than we could take care of and have turned down many new inquiries for furnaces because we were not in a position to take care of them.

Whether or not warm air heaters give longer service than hot water or steam, depends very largely upon the user. We have Boomer Furnaces that have been in use covering a period of from twenty to twenty-five years, calling for very few, if any, repairs. If any furnace is misused, it can be burned out in a few years' time.

It is our opinion that the maintenance of warm air heaters is less expensive than other systems of heating.

We do not believe that the pipeless furnace should be used in any house containing more than four rooms—two down, and two upstairs.

We are strong believers in the use of asbestos covering for warm air ducts.

There are many dealers who are attempting to install furnaces, who should be better educated as to how properly to install the same and get good results.

There is no question but what considerable damage has been done to the warm air heater industry because of the small furnaces being installed.

No doubt, much good would result from having dealers come to the factory and study the process of production. We have had some of our dealers visit our plant.

Beyond question, benefit is to be gained from having salesmen call the dealers of the district together and explain the technical, as well as selling advantages of the warm air heater which they are handling.

We are aiming as far as possible to educate our respective dealers how to properly install a furnace, to be sure that a furnace of sufficient size is specified, properly located and properly connected with the warm air pipes and cold air duct.

We are lending considerable assistance to our dealers in helping them plan difficult jobs. We are very much concerned about the installation of every Boomer Furnace, to the extent that we want them to give perfect satisfaction.

From One Article to a Full Line of Furnace Accessories.

By C. J. Pearson, Vice-president United States Register Company, Battle Creek, Michigan.

The United States Register Company, Battle Creek, Michigan, with branches at Minneapolis, Kansas City, Des Moines and Albany was organized in the year 1901, for the purpose of manufacturing the Jones Side Wall Register which was invented by the president of the company, Mr. Almon O. Jones.

The wide-awake furnace dealers appreciated the Jones Side Wall Register and the economical result it afforded any furnace in connection with which it was installed to such an extent that in 1906 the Company was obliged to enlarge its plant at Battle Creek, Michigan.

This growing demand became so wide that in 1909 the members of this organization realized that their manufacturing facilities at that time were inadequate and in the year 1910, another large addition was built which practically doubled the capacity of their second plant.

At about the same time the Company opened a branch office and factory on 2nd Avenue, Minneapolis, Minnesota, in a leased location, but the demand for Jones Register, furnace pipe and fittings increased so rapidly that it necessitated the purchasing of land and the building of a factory at Minneapolis.

Shortly after the opening of the original branch office and factory at Minneapolis, the demand for the

improved Jones Registers began to show itself in the southwest, making it necessary to open a branch office and factory of the United States Register Company at 510-512 West 5th Street, Kansas City, Missouri.

Early in the year 1912 a branch office was opened in Des Moines, Iowa, for taking care of the trade in that state.

At about this time a third addition was added to the main factory at Battle Creek, Michigan.

In that same year it was also found necessary to open a branch office and factory in Albany, New York, to supply dealers in New York, New Jersey and eastern Pennsylvania.

When the wood cold air faces were introduced originally, the United States Register Company handled these for a short period on a jobbing basis but the business grew so rapidly that in 1915 steps were made to build and equip one of the most modern and up-to-date wood working mills for the purpose of manufacturing wood cold air faces.

The year of 1920 showed such rapid strides in the increase of business for the branch office and factory of this company at Kansas City that despite inflated real estate values, they were, out of necessity, to supply this increasing business, obliged to purchase a site at 332-336 West 5th Street, Kansas City, and remove the old buildings from this site and at the present time are rushing to completion a modern three story and basement office and factory building, with a frontage of over 60 feet and the depth of about 130 feet.

For the same reason, it is necessary to be governed by the same policy in the Iowa territory and at Des Moines, the United States Register Company are building a new factory and office building very similar in size and detail to that of their new Kansas City factory.

The development of the Company's business soon gave rise to the introduction of the National Base Board Register, International Base Board Register, steel floor registers, faces and borders of all kinds.

Later, with the advent of the pipeless furnace, the United States Duplex Gratings and United States Adjustable Ceiling Registers were placed on the market.

Feeling still a further demand for something that is an improvement over the regular Duplex Grating as commonly used with the pipeless furnace the Company originated, manufactured and placed on the market the National One Pipe Register which supplants the unsightly Duplex Register, makes possible a better type of installation, and removes the objections to the Duplex Grating.

The foregoing explains how with close attention, labor, and concentrated effort, one of the largest enterprises of its kind in the world has been developed from one of the smallest—starting in with making one line and spreading out until the United States Register Company, at the present time, manufactures and can furnish from any of its factories everything that is needed for the installation of a pipe or pipeless furnace, excepting the furnace and casing.

"If you would be pungent, be brief; for it is with words as with sunbeams—the more they are condensed the deeper they burn."—Southey.

Return to Pre-war Prices Is Not Deemed Practicable Because of Costs of Manufacture and Distribution.

Increased Freight Rates on Raw Materials and Finished Products Are Among the Fixed Expenses Likely to Remain.

In the matter of economics, it is unwise to dogmatize.

The astronomer knows to the minute and second when Halley's comet will reappear. But the shrewdest economist can not foretell with any degree of certainty the length or curve of the orbit of prices.

By taking thought, no one can cause Halley's comet to deviate a millionth part of an inch from its course; and its journeyings through space are unaffected by passions or emotions of humanity.

It is not so, however, with prices of commodities. These are subject to change by the whims of the day.

Even in the face of irreducible costs, prices often have been forced below the actual expense of putting the commodities on the market.

The recent flurries in retail textiles are an example to the point.

Out of the welter of conflicting theories certain probable conclusions are taking form.

Insofar as we may judge price tendencies by the parallels of history in post-war periods, it seems to be the general opinion that prices will not return to the levels of 1914.

Indeed, it is a question whether or not the commercial welfare of the warm air heater industry would be benefited by a return to before-the-war price levels.

The reasons are postulated upon the lack of uniformity in national industries.

That is to say, readjustments do not and can not, perhaps, take place uniformly, equally, and simultaneously throughout every part of the country, in every industry, and in every form of merchandising distribution.

In this view of the matter, a return to pre-war price levels would necessarily entail grave injustices and economic inequalities which are not defensible on any

ground of national or local welfare.

The majority of warm air heater manufacturers questioned on this matter by AMERICAN ARTISAN AND HARDWARE RECORD are of the opinion that no tangible benefits could accrue to the industry by a return to before-the-war prices.

They believe that prices should be stabilized in order to eliminate as far as possible the fluctuations and uncertainties which are harmful to business development and which prevent planning ahead for larger operation.

For example, G. A. Wells of Wells Furnace and Supply Company, St. Louis, Missouri, declares that the benefits of a return to pre-war price levels are questionable.

"We are inclined to think that the user is more likely to prefer higher efficiency than to insist on reduced prices," he says.

"It is the natural tendency of human nature to associate high quality with high price and it is probable that comparison is most frequently made with steam or hot water systems when price is asked on warm air heaters.

"Indeed, the enormously higher cost of steam heating systems must create the impression of superiority and there is no other reason for such a conclusion.

"Heating and sanitary engineers know that a properly designed and well installed warm air furnace affords the best heating for a residence as well as the cheapest."

From another angle of the question, the Campbell Heating Company, Des Moines, Iowa, believes that "It does not make much difference how high or how low prices are. It is changing prices that hurt. Gradual reduction should be the future policy of all price-makers, but only as conditions justify reductions."

A prominent manufacturer in the South gives it as

No less an expert than Professor Irving Fisher of Yale makes the positive statement that prices are on a permanent high level.

Of course, he does not mean to give the impression that the abnormally high prices of the war days will remain in effect.

It is not difficult to perceive, however, that actual return to the levels which obtained before the war is impracticable in the present circumstances.

Permanent increases in freight rates have been granted to the railroads of the country. These increases affect the whole cycle of industry and merchandising.

The added cost is not applied to only one phase of production or distribution. Every step in the getting out and transportation of raw materials is involved in the freight raises. Manufacture and distribution as well as labor are brought within their scope.

Manifestly, wages can not be reduced to pre-war levels any more than costs of manufacture and distribution. The increased expenses must be absorbed all along the line.

Making allowances for these and other conditions, there is a margin of relative costs and prices in which changes and reductions may and can become operative. On this point, it would be unwise to make predictions.

his opinion that

"When all standard commodities shall have returned to a pre-war price basis, the warm air furnace industry possibly will be benefited by like returns.

"But since warm air heaters have always been sold at a price much less than their real value, we can see no advantage at all in a premature reduction even if merchandising condition should force the final move."

Practically all manufacturers of warm air heaters are agreed that a sudden and great decline of prices would be detrimental to the industry.

Some believe there is room for a moderate reduction, provided that similar reductions take place in all other industries.

Indirectly, but, nevertheless, effectively, the cost of flour and shoes and butter and eggs and books and pocket knives influences the cost of warm air heaters.

The mechanics, salesmen, and installers who take part in the making and merchandising of warm air heaters need to get enough wages or salary from efforts to buy the necessities of life.

Consequently, these necessities have a bearing upon the making and distributing of warm air heaters.

Furthermore, it should be remembered that the really important thing is an adjustment of the relationship between commodities and wages.

If a molder gets eight dollars a day and can buy only four dollars worth of goods at the prices prevailing before the war, then his eight dollars is only four dollars. Stated in another way, the nominal wages are the amount of money received for labor. Real wages are the amount of goods which can be purchased with the wages received.

It is apparent, therefore, that the problem is not one of a return to before-the-war prices but of adjustment between commodities and the purchasing power of the dollar.

Another factor of great importance in the maintenance of prosperity is purely mental.

We live and act largely through our imaginations.

Set a substantial meal before a man on a rough wooden table in a disorderly dining room with soiled napkins and ugly cutlery, and he will not derive the same satisfaction and—some authorities assert—the same amount of nourishment from the food as if it were served in pleasing circumstances with snowy napery and the usual garnishments of a well-appointed dining room.

Although the amount of money paid in wages and salary may be greater than the amount before the war, and although there may be little difference in what can be bought with the wages and salary, nevertheless, the psychologic effect is helpful toward maintaining a spirit of prosperity.

There has been much talk about working men wearing silk shirts.

The thing has been overdone.

Under the Constitution of United States, a worker has as much right to such fineries as any other citizen.

Indeed, it is good for him to take a pride in his personal appearance.

It gives him ambition, neatness, and helps develop the higher ideals of living which are basic in Americanism.

The bad effects are merely temporary. The good effects are lasting.

It is better for our country that we have ambitious workers, owning better homes, and desirous of giving their children better educational facilities.

Industry, in the long run, profits by workers of that sort.

In the final analysis, therefore, the question of return to before-the-war price levels is of considerably less importance than appears at first glance.

The really essential thing for business everywhere is that prices be stabilized so that they are proof against violent fluctuations which are harmful to all concerned.

It Would Be Suicidal to Go Back to Pre-War Basis.

By Jesse M. McHenry, of Bridge & Beach Manufacturing Company, St. Louis, Missouri.

In my experiences covering a period of many years I have enjoyed unusual opportunities to study the warm air furnace business from all angles, through from the retail business and installing to manufacturing and advanced engineering.

The further I go the more interesting the game becomes and the more enthusiastic I grow.

One who has been so intimately associated with the industry during its marvelous growth during the past decade could not be other than enthusiastic.

My identification for the past two years with the engineering enterprise as financed by the National Warm Air Heating and Ventilation Association and carried on through the Engineering Department of the University of Illinois, has served to intensify my interest and enthusiasm.

I wish it were possible for many retailers and manufacturers of furnaces to visit the laboratory plant and observe the equipment and the work at close range.

The manufacturers and retailers and, may I also add the public at large, are greatly indebted to the University and more particularly to Professor Willard and associates for undertaking this important piece of work and for the vigorous manner in which it is being prosecuted.

To the trade journals, including your valued publication, which have so generously devoted space to the finding and distribution of information as developed by the engineers, we all owe a lasting debt of gratitude. May I express my personal appreciation for the interest manifest and the service rendered by the AMERICAN ARTISAN AND HARDWARE RECORD?

The questionnaire accompanying your letter addressed to the Bridge and Beach Manufacturing Company, with which I am now associated, comes to my desk for attention.

I note with interest the questions asked and the various subjects introduced, any one of which could be used for a long and profitable discussion.

My disposition and training has, in some way disqualified me for intelligent generalizing. So I feel that anything that I may write, if at all interesting to others, will, I am sure, be more so and possibly somewhat helpful if I take a text and stick to it.

With this in mind my comments will be confined to a subject suggested by questions one and two which refer to the present and possible future market price on warm air furnaces.

In the face of recent events and developments affecting the market prices of various articles of merchandise, I can imagine the receipt of answers to these two questions revealing a great diversity of opinions.

Some answers I fear may be prompted by the personal desires or interests of the writers. Others no doubt will be influenced more or less by observations of local conditions only.

The subject involved is altogether too broad and important to be considered in a narrow sense.

It is national in its cope and the public's interest is vitally involved.

What I may say will represent conclusions forced on me from an effort to analyze fairly the general situation as it now is and as it may be in the near future.

I shall of necessity have to be brief, hence shall be permitted to touch the high spots only.

May I abruptly ask, therefore, whether or not the general public's interest demand or is there in the mind of the general public a deep seated desire that the average compensation as now established for labor be radically and arbitrarily reduced?

To this question I am sure the almost universal reply from right thinking minds would be emphatically in the negative.

All right: if that be true by what process of reasoning can one arrive at a conclusion other than that it would be simply suicidal to attempt to return to pre-war prices on furnaces and kindred appliances when, as is easily demonstrated, 80 per cent of the cost of production represents labor's compensation?

This being the case, how can we hope for or expect any material reduction of prices which are honestly—I repeat honestly—based on production and distribution costs plus a fair return on capital invested?

I am anxiously and expectantly looking forward to the return of a stabilized commercial manufacturing situation.

To this end it is perfectly apparent to all that many adjustments and equalizations will be necessary and, may I add, that these required changes and adjustments must of necessity affect the prices of some classes of materials and labor.

I am perfectly confident, however, that the interests of all will be conserved by permitting these changes and readjustments to evolve through the operation of natural forces, rather than by arbitrary acts which would tend to exaggerate an already unstable situation.

The foregoing is emphasized in spite of the recent reduction in the prices of many commodities.

In this connection may I refer to the well known fact, that conditions susceptible of manipulation, and the selfish interests, which have conspired to force the prices of a long list of merchandise to excessive altitudes and subsequent developments which have caused precipitous descents to lower levels have never been, are not now and will not in the future become operative in the furnace or stove industry.

This being an industry established, and one which

will continue on a highly competitive basis, there is no encouragement for the speculator or profiteer in this field.

Some may, and undoubtedly will say, that the motor car industry is also on a competitive basis. Just see what has been done by some of these interests in the matter of reducing prices.

Let us admit, if for nothing more than the sake of an argument, that there is strong competition in the motor car industry.

I am aware, too, of the announced reductions from former prices of several cars, but, may I add, the situation confronting the motor car industry, particularly the pleasure car interests and that of the stove, furnace and allied interests are altogether dissimilar.

Pleasure cars are classified and, in fact, are luxuries.

Among thinking folk of the great middle classes, luxuries and extravagances are, in these latter days, becoming quite unpopular.

This is rather a happy change now possessing the minds of persons and families of moderate means.

This fact, together with other influences of which it is unnecessary to speak at this time, have operated to greatly restrict the demand for pleasure cars, resulting in the accumulation of surplus stocks.

It is a known fact that the recent announcements of greatly reduced prices on some makes of pleasure cars was not brought about through reduced production costs, but solely with the view of stimulating buying, thus reducing accumulated stocks, and bringing about a situation making it possible to continue the operation of factories making cars and accessories.

This leads me to cite the fact that warm air furnaces, stoves and allied lines are not considered luxuries.

As a matter of fact they are universally considered highly essential and very necessary to the welfare and comfort of society.

I close rather abruptly with the following brief paragraph:

Any marked and reasonably permanent changes in the market prices of materials and labor whether up or down, will, without delay, be reflected in changed market prices, wholesale and retail alike, of warm air furnaces, stoves and allied lines.

New Line of Warm Air Heaters Will Be on Market January First.

An entirely new line of warm air heaters has been designed by the Standard Furnace & Manufacturing Company, DeKalb, Illinois, which will be sold to local installers under the name of "Titan."

This Company has been engaged in the manufacture of warm air heaters for many years, and their new line is a combination of the best features of some of the most successful heaters on the market.

The officers of the Company are:

A. M. Wheeler, President.

D. H. Hunt, Treasurer.

Seymour Hunt, Secretary.

Wesley J. Johnson is Sales Manager.

Has Record of Twenty-Five Years of Installations.

Twenty-five years of successful installation of warm air heaters is the record of Muelenberg Sheet Metal and Roofing Works, 423-425 East Main Street, Kalamazoo, Michigan.

John Muelenberg, manager of the concern, has been with the business since its inception, and has aided in developing it into the largest sheet metal shop in Western Michigan, employing thirty men and using a three-ton truck and three automobiles.

During fifteen years of the time, Mr. Muelenberg has been selling Gilt Edge furnaces and expects to continue to sell them as long as he remains in business.

The manager of the Furnace Department, A. H. Coleman, was in the Air Service during the World War. He will use air service tactics this coming year to sell twice as many furnaces as in 1920. He says that there are Gilt Edge furnaces that have been in service in Kalamazoo for thirty years and are good for many more years to come.

During 1920 the Muelenberg Sheet Metal and Roofing Works have installed nearly one hundred furnaces, but are looking forward to a better year in 1921.

The Muelenberg Sheet Metal and Roofing Works moved to their new quarters, at 423-425 East Main Street, Kalamazoo, Michigan, last spring.

In the new location they have a large office and display room 25x30 feet with Mr. Muelenbergs' private office in the rear.

In addition, there is a shop 60x120 feet which affords ample space in which to store furnaces and roofing material.

Mr. Muelenberg carries his sheets in piles on the floor instead of using racks. Most of the time he has from three to six tons of stock on hand.

Besides, he carries an ample stock of Gilt Edge furnaces, manufactured by R. J. Schwab & Sons Company, Milwaukee, Wisconsin, and an extensive assortment of roofing material. Therefore, he is ready for any job in his line that may come up.

Beginning January 1st, M. Van Haaften will be foreman of the Furnace Installation Department. C. DeSmit will be inside foreman of the Sheet Metal Department.

Mr. DeSmit has recently returned to Kalamazoo after spending three years in one of the largest colleges west of Chicago where he was teaching mechanical drawing in the sheet metal department.

The roofing department is in charge of Jim Murray who has served many years at the trade and has a wide experience embracing all types of buildings in many parts of the United States.

Cast Iron Smoke Pipe Improves Service of Warm Air Heater.

The warm air heater, regardless of make, can be satisfactory only as long as it gives service.

In the judgment of the user, the warm air heater which gives the most service at the least expense is the best.

Admittedly, without a satisfactory and substantial smoke pipe a warm air heater can not give the best service.

Strictly speaking, the smoke pipe is not an integral part of the furnace. But it exercises a highly important function in the successful operation of the furnace.

There is no use in denying that a smoke pipe which needs frequent replacement—every year or two—is



Muelenberg Sheet Metal and Roofing Works, Kalamazoo, Michigan.

only partially satisfactory.

A smoke pipe which becomes eaten out and permits of the possibility of sparks dropping out and causing fire is even less satisfactory.

On the other hand, a smoke pipe that will last practically a lifetime; that is indestructible from ordinary causes that affect other smoke pipes; a smoke pipe which once up is up to stay; which needs no replacement; of which the first cost is the only cost; a smoke pipe that outlasts the furnace, is of as much importance to the trade as the furnace itself.

These desirable qualities are said to be characteristic of the Knox Everlasting Cast Iron Smoke Pipe manufactured by the Waterloo Register Company, Waterloo, Iowa.

The Knox Everlasting Cast Iron Smoke Pipe is furnished in sections to be bolted together. It is cast in one-half sections so that it can be tightened to fit openings.

A commendable feature of this smoke pipe is that the sections are interchangeable to fit each other and that they nest closely for shipping.

The Knox Everlasting Cast Iron Smoke Pipe is furnished in two-foot, one-foot, and six-inch lengths to enable fitting to any distances.

The Waterloo Register Company declares that actual use under most adverse conditions has demonstrated that the Knox Everlasting Cast Iron Smoke Pipe is hole-proof, soot-proof, and wear-proof.

Over-size Warm Air Heater Is Recommended by Majority of Installers to Give Comfort Under All Conditions.

In Severe Zero Weather a Furnace of Theoretically Correct Size Frequently Fails to Heat All the Rooms of a Dwelling.

The rules for finding correct size of furnace for dwellings of given cubic capacity are only approximately correct in their application.

Take any two dwellings of identical construction and you will find differences in the proportion of heat losses.

A dwelling on a corner lot exposed to northeast winds is more difficult to keep warm in zero weather than a similar dwelling in a more protected location.

The furnace which is of theoretically correct size for a dwelling in average winter weather often proves inadequate when the mercury falls eight or ten or more degrees below zero.

In such circumstances, forced draft and frequent firing do not suffice to give the comfort which the household-er has a right to expect from his furnace.

Consequently, it is a wise thing to install a furnace which is at least one size larger than that which is theoretically required for heating the dwelling.

The over-size furnace has a reserve capacity which is most desirable and satisfying in emergencies.

It may be said with considerable justification that one of the chief obstacles to wider popularity of the warm air heater is the failure of the warm air heater to give satisfaction in unusually severe cold weather.

That this is the judgment and experience of numerous practical installers of warm air heaters is quite evident from the majority of answers received from installers in re-

sponse to a questionnaire on the subject sent out by AMERICAN ARTISAN AND HARDWARE RECORD.

The following responses may be said to be fairly typical of the general view in the retail trade:

W. E. Foncannon, Ashland, Kansas, writes: "I think a furnace larger than is required gives the best service as you do not have to heat it to full capacity. Moreover, it will not burn out so quickly, nor do you

have to fire it so often."

"I would prefer a furnace a little larger than the size big enough to heat the space," says H. T. Maring, of Gettysburg, Pennsylvania.

In the opinion of Martin Ludwig, Albany, Oregon, whose experience extends over several years of successful installations, "a furnace which is a little too large is better than one which is not big enough for the house."

Frank D. Schneider, President of Schneider Hardware Company, Oconto, Wisconsin, outlines his method of procedure as follows: "We believe in the over-size furnace, depending in what section of this country the furnaces are installed. We add 10 per cent for every degree below zero, as we understand that the manufacturers' ratings as given in their catalogues are based on outside temperature at zero. Consequently, larger size furnaces are required in places where there is much below zero weather."

The balmy breezes of summer in Ames, Iowa, are often replaced in winter by icy blasts which are far from pleasant. John R. Jones, furnace installer of that town has built a fine business by having the wisdom to take this fact into consideration when estimating the size of the furnace to be installed. He writes that he is strong for the over-size furnace because it is better for the householder and better for the installer.

Roger Keith of Des Moines, Iowa, says that he believes in the use of an over-size furnace: "if flue draft and furnace design and installation

are conducive to get combustion with slow fires usually in oversize jobs."

Joseph Harmon of Duluth, Minnesota, states that he always figures 25 per cent in that cold weather climate. "Too large a furnace," he says, "is a good fault. The first cost to manufacture a small furnace over that of a large one is not very much. Therefore, it ought not to cost much more to put in a big furnace

WHEN an engine or a typewriter or a saw or any other tool fails us in a critical moment, we are apt to condemn it without reservation.

We do not stop to think of the satisfaction which we derived from it hundreds of times in the past. We think only of its failure in the present instance.

It is pretty much the same with a warm air heater. No matter how satisfactory it may be in average winter weather, if it fails to keep us warm when a blizzard is raging, we are likely to condemn it and to experience a sense of resentment against the installer who sold it to us and put it in.

Rightly or wrongly, this is the usual slant of human nature. It is better, then, to prevent such untoward happenings than to try to explain them in advance of their occurrence.

On the ground of service, satisfaction and good will, the over-size furnace benefits the trade, serves the householder and prevents needless grumblings and profanities.

that is sure to take care of all kinds of cold weather."

The Lawrence-Henry Furnace Company, Uhrichsville, Ohio, declares: "We never heard of an over-size furnace. We thought the bigger the furnace the better. Too many furnaces are installed which are altogether too small for the purpose for which they are intended, namely, to give healthful, comfortable heat under all conditions of temperature."

"I find where the under-size furnace is installed, it is frequently overheated and soon burns out," is the report of S. J. Beard, Republic, Ohio.

The policy which is unmistakable in its practical benefit to all concerned is announced by the Churchill Hardware Company, Galesburg, Illinois, in answer to the questionnaire, namely, "We always put in furnaces very much over-size."

H. B. Huffaker, Manager Furnace Department of P. C. De Vol Hardware Company, Council Bluffs, Iowa, answers as follows. "We sell a pipeless furnace and will not install one whose rated capacity is not at least from 5,000 to 10,000 feet over cubic contents plus addition for outside walls and glass for building to be heated."

One of the most enterprising installers in Nebraska is W. W. Pascoe of Chadron, Nebraska. He has developed a lucrative trade through intensive advertising and high grade service. He says: "I always put in an over-size furnace and find it will last longer and give better service."

Even the most enthusiastic advocate of the North Dakota climate will not go so far as to say that its winters possess the mildness of Palm Beach. In North Dakota a furnace must be big enough to give continuous satisfaction during the severest months of winter. That is the reason why O. H. Neuenfeldt, Enderlin, North Dakota, emphatically affirms his belief in the over-size furnace as being better for the furnace installation business and better for the householder.

The Perryville Hardware Company, Perryville, Missouri, states: "We always advocate a larger furnace than absolutely necessary."

Qualifying his belief in the advantage of an over-size furnace, A. C. Buzzard, Holly, Michigan, says: "The furnace should not be too large. Give the next larger size the benefit of any doubt."

Being in business for his own good and desiring to enlarge his trade, through the good will of satisfied customers, Mr. C. M. Bronson, Lewiston, Idaho, says that he finds the over-size furnace a good advertisement. It gives satisfaction. It takes care of cold weather emergencies, and he never gets any complaints. Therefore, he feels free to refer to such customers when soliciting new business.

The Prange-Geussenhainer Company, Sheboygan, Wisconsin, holds a somewhat different opinion regarding the oversize furnaces from the general run of installers, saying: "A furnace may be barely adequate for eight or ten days of the heating season, of sufficient size for eight or ten weeks of the heating system and much too large for the remaining part of the cold period when people need a fire to keep comfortable."

"Therefore, it is hard to say what really constitutes

an over-size. Ninety-nine out of hundred consumers say a furnace is being crowded when you have the draft open and admit as much air as is necessary for proper combustion.

"Every now and then some house owner has taken out a large furnace and substituted a smaller one, but you never hear him make a holler. Invariably, when the cold weather sets in and a brisk fire is necessary the claim is made the heating apparatus must be crowded.

"In our opinion it is better for the householder to have a furnace just large enough for the cold weather, which at the most lasts only a few days or weeks and at all other times during the winter the furnace is an over size.

"The dealer's standpoint, however, is different, he must cater to the customer a great many times against his better judgment."

Beyond doubt, a furnace one size larger than the theoretically adequate furnace is advisable in most circumstances. The warm air heater trade has strong competition from other systems of heating. It behooves every one connected with the industry, therefore, to give the utmost service and satisfaction.

There is no room for controversy regarding the superiority of the warm air heater over other types of heating.

If the warm air heater is to gain wider acceptance throughout the country it must be through intelligent adaptation of the warm air heater to requirements of individual dwellings.

As several installers have pointed out, it is better to make an error on the side of bigness than to install a heater which is not sufficient to give comfort under all conditions of temperature.

Emphasizes the Rightness of the Farris Furnace.

By C. H. Spaulding of the Farris Furnace Company, Springfield, Illinois.

The manufacturer who builds a new machine from the ground up has a great opportunity.

He is not bound by self-interest, nor constrained to conform to obsolete patterns and methods.

Joseph Farris, proprietor of the Farris Furnace Company, Springfield, Illinois, realized this opportunity when he brought out the Farris furnace some five years ago.

His only aim was perfection in his product, leaving problems of production and marketing for secondary consideration.

The result is the Farris furnace, and the standing that it attained at once reflects its merit.

The large combustion dome combined with the pre-heated draft over the fire solves the problem of efficiency in soft coal combustion, while the air tight and gas-proof construction is a unique feature of the Farris furnace.

The grate, the shaking mechanism, the drafts, in short, all details have been made to conform to the Farris standard of quality.

The favor with which the furnace is received wherever it goes is constantly renewing the dealers' confidence in the rightness of this furnace.

Chimney of Right Proportions Is Essential to Furnace.

By N. W. Taplin, President and General Manager, Taplin Furnace Company, Grand Rapids, Michigan.

Because much time and money has been expended in designing and building improved types of warm air



N. W. Taplin, President and General Manager, Taplin Furnace Company, Grand Rapids, Michigan.

furnaces which would make for greater economy in heating, it would be no more than fair for architects and builders to do their part in furnishing chimney flues of the proper size, shape and height, to insure the furnace doing the work for which it was intended, and in an economical manner.

A study of the size and shape of the average chimney flue to which the heating contractor is compelled to attach a furnace shows a wonderful discrepancy in the

designing and building of these chimneys.

A furnace itself has no draft, although the satisfactory and economical operation of the furnace depends more on this one item than on any other.

The furnace may have been installed in such a manner that it could not be criticized, and yet it might consume an unreasonable amount of fuel from which a fair amount of heating value could not be obtained.

In view of the importance of an adequate chimney flue in the operation of a warm air furnace, let us say a few words regarding the proper size and shape which these chimney flues should be and the reasons why they should be so shaped.

There are two movements within our Solar System, one of which requires all primary planets to rotate from west to east, each rotation constituting a day, and the other the movement of all primary planets which revolve around their sun in the same direction in which they rotate on their own axis, or west to east.

I shall not attempt to describe in detail the different currents of air caused by these two movements, but will state that the circular movement of smoke or heated air rising in a chimney flue is always from right to left.

This can be easily demonstrated in your own home by making three sections of chimney flue of the same proportions as found in the ordinary house heating chimney.

Take some cardboard and make one section 4 inches by 4 inches by 2 feet, one section 4 inches by 8 inches by 2 feet, and one 4 inches round, leaving a hole at bottom of each to supply draft.

Now blow smoke into the bottom of the 4 by 4 section and watch its motion.

You will note that it travels in a circular motion, from right to left, and the rising column is 4 inches in diameter.

Next try the 4 by 8 section, having twice the area, and you will note results are the same, the rising column having a diameter equal only to the smallest dimension of the rectangular flue, and leaving the balance of the flue as a creator of down drafts to work against the rising column of smoke.

Next try the 4 inch round section, and you will note that the rising column of smoke conforms exactly to its diameter.

Thus it will be seen that a round flue is the best, because of the fact that the smoke traveling in a circular motion, the entire area of the flue is utilized.

To apply this in practice, let us suppose we have a furnace requiring an 11 inch smoke pipe, with an area of 95 square inches.

Were this furnace attached to an 11 inch round chimney, or one 11 inches by 11 inches, the furnace would work satisfactorily, but were we attaching it to the commonly used 8 inch by 12 inch flue, having an area of 96 square inches, it would not do the best work, because of the fact that the smoke rising in a circular motion, the greatest diameter of the rising column could not be greater than 8 inches, or the smallest dimension of the rectangular flue.

Thus we would be attaching a furnace requiring 95 square inches of flue capacity to a chimney having but 50 square inches actual available capacity, with what dire results many of us have learned to our sorrow.

A 4 inch by 12 inch flue has no advantage over a 4 inch by 4 inch flue, and an 8 inch by 12 inch flue has no advantage over one 8 inches square, in fact is not so good on account of space being provided to encourage down drafts.

The ideal chimney flue is round, of good height, and should equal or exceed in area that of the smoke neck of the furnace attached to it.

An extra damper placed in this flue directly above the point where the smoke pipe enters is also advisable, as there will be times when the regular damper will not be sufficient to control the draft.

Also avoid deep air pockets in the bottom of the chimney flue, extending the flue proper only to a point just below where smoke pipe enters, and in no case leaving more space than sufficient to accommodate a 2 inch by 8 inch cleanout door.

It is safe to say that when a manufacturer recommends an 11 inch smoke pipe for a certain size furnace, that there is a reason for it, and any attempt to reduce this area is bound to bring disastrous results, part of which is often times laid at the manufacturer's door when in reality he is in no way to blame.

It is not the place nor the condition, but the mind alone, that can make one happy or miserable.—L'Es-trange.

The Pipeless Warm Air Heater Has Gained a Definite Position of Service for Certain Types of Dwellings.

Gone Are the Pioneer Days of the Pipeless When Exaggerated Claims Caused Distrust and Ill Feeling in the Trade.

Progress always involves the overcoming of prejudices. With extremely few exceptions, every advancement in civilization and every radical improvement in mechanical processes have encountered more or less virulent opposition.

The first steam boat was laughed at as a foolish device which would never become practical.

The telephone and numerous other inventions were objects of ridicule during their experimental stage.

It is a peculiarity of human nature to be skeptical of anything which marks a departure from established custom and habit.

The pipeless furnace was no exception to the rule. It received more than its share of abuse and condemnation in the early days.

The first manufacturers and advocates of the pipeless warm air heater had the enthusiasm of their convictions—an enthusiasm more fervent than practical.

They dreamed great dreams. They had visions of marvelous accomplishments. Their imaginations swept them forward over all obstacles. They rode on air.

In the excusable fervor of their hopes, they made claims of performance for the pipeless furnace which, unfortunately, were not realized and, perhaps, could not be realized in practice.

Their advertising departments got the fever from them, and almost exhausted the supply of superlative adjectives in describing what the pipeless furnace would do in all circumstances.

Not every fever is contagious. Therefore, there were many dealers and installers who remained immune.

They looked with suspicion upon the highly colored language of the advertisements. Many of them put their objections into more forcible language.

Thus it came to pass that the exaggerations in favor of the pipeless furnace were matched by denunciations as illogical and extreme as the claims were extravagant.

In spite of these unfavorable conditions, however, a demand was created for the pipeless furnace on the grounds of its lower cost and lessened expense of installation.

Gradually, experience demonstrated the limitations within which the pipeless furnace gave complete satisfaction.

Today the pipeless warm air heater has won a sure place and is capable of performing a satisfactory service for certain types of dwellings.

In answer to a questionnaire sent to furnace manufacturers by AMERICAN ARTISAN AND HARDWARE RECORD the prevailing judgment and experience with reference to pipeless furnaces may be summed up as follows:

The Modern Way Furnace Company, Fort Wayne, Indiana, replied that the structural conditions of a dwelling most favorable to the use of a pipeless warm air heater are "good openings and the house of square type or compact so that the heat does not have to travel far or through small and low doors."

"Open stairway, doors extending nearly to the

NOT many years ago the warm air heater industry was seriously disrupted by arguments for and against the pipeless furnace.

Much bitterness was developed in the controversy. The pipeless was looked upon by many as a disrupting factor.

It was freely predicted that the trade would suffer great loss of prestige by reason of the defects and limitations of the pipeless furnace.

In some quarters an active fight was carried on against the new system of one pipe furnaces and the matter was taken into the columns of trade journals.

By degrees the rancor of the dispute gave way to less passionate exchange of argument.

Bit by bit prejudices on both sides dissolved into friendly comparison of ideas and experiences.

Now, at the end of the year 1920, the pipeless warm air heater has won a position of well defined service from which it can not be ousted without damage to the general well being of the industry.

From the criticisms which were so freely expressed during the formative stage of the establishment of the pipeless warm air heater grew certain definite advantages, which are embodied in the present type of pipeless furnace to the benefit of the customer and the profit of the manufacturer.

Although in retrospect there is much to be regretted in the animosities which characterize the early days of pipeless furnaces, nevertheless, they were not wholly an unmixed evil. They stimulated the advocates of the pipeless furnace to make such efforts and improvements as would strengthen their position against the attacks of their opponents.

ceilings, a good open interior, or the use of grills at ceiling or floor lines," are specified as the most favorable conditions for the installation of a pipeless furnace by the May-Fieberger Furnace Company, Newark, Ohio.

According to the Edwards Heating Company, Wellsboro, Kentucky, the most favorable structural conditions for the pipeless warm air heater are: "Plenty of arches and open wherever possible."

In the opinion of the Huron Furnace Company, Huron, South Dakota, the pipeless warm air heater may be used to advantage in any ordinary sized dwellings, churches, or business buildings.

H. V. Bayse, President American Furnace Company, St. Louis, Missouri, answers the question as follows: "A one story small cottage is most favorable for the pipeless warm air heater. However, we still maintain that regular pipe installation with a bottle top casing with one large register over the same with a separate cold air pipe kept away from the air casing is much better in the same house. We make that statement as makers of both types of furnaces."

The square house with a hall in the center is deemed the most suitable for effective service from a pipeless warm air heater by the Hammond Heating Company, Cincinnati, Ohio.

In the judgment of I. M. Adams, Manager, Furnace Department, The Favorite Stove and Range Company, Piqua, Ohio, the house best adapted for the pipeless warm air heater is: "A compact dwelling with open stairways and large doors and archways between the rooms with comparatively low ceilings."

"All rooms should connect so that there will be free circulation of air through open doors or through transoms when doors are closed," declare the Wells Furnace and Supply Company, St. Louis, Missouri. "If more than one story, the floor should be connected by an open stairway and the upper floor should have free air circulation as stated for the first."

The most suitable conditions for a pipeless warm air heater are tersely stated by the Majestic Company, Huntington, Indiana, as: "A square open house without a hall."

The Chattanooga Roofing and Foundry Company, Chattanooga, Tennessee, declares that: "In order to do its work, the air from the pipeless furnace of the Cahill type must be given free passage to all parts of the house which it is desired to heat. In order to heat a dwelling, the furnace must be able to get at the dwelling. The freer the circulation and the more equitable

the distribution of the currents of warm air, the better the results gained."

According to the Hess Warming and Ventilating Company, Chicago, Illinois, the pipeless furnace gives best results in a house with rooms that have "liberal side openings from room to room; compact form of house; heat-retaining construction; the storm sash, etc."

Roger Keith of Keith Furnace Company, Des Moines, Iowa, gives it as his judgment that the structural condition of a dwelling most favorable for the use of a pipeless warm air heater where: "Wide open doors, open stairway, and compact small dimensions."

A house built on the daylight plan or square with place in the center of building for the register and transoms or grill work over the doorway is specified as most suitable for the pipeless warm air heater by John H. Gundersdorf, Sales Manager, S. P. Sexton Stove Manufacturing Company, Baltimore, Maryland.

"The occupant is a more important factor than the structural conditions of a dwelling," is the affirmation of the Campbell Heating Company, Des Moines, Iowa. "However, cased opening and open stairways are essential unless grills are used freely in walls and ceilings."

The Sterling Furnace Company, Grand Rapids, Michigan, says that the type of dwelling most suitable for the pipeless furnace is one that is "squarely built with open doorways and rooms not isolated."

Among dealers and installers of warm air heaters, there is a remarkable agreement of opinion regarding the type of building best adapted for satisfactory use of the pipeless furnace.

It is to be noted with pleasure that service is emphasized by dealers and installers as the chief factor in their business.

J. N. Dyer, Morristown, Tennessee, prosperous sheet metal contractor and furnace installer, declares: "I believe that the idea of a true service given is the thing that will insure confidence and maintain a lasting patronage. I can not see how a dealer who knows nothing about warm air heating business, who sells and recommends pipeless furnaces for all kinds of houses and installs even pipe furnaces with unskilled labor, and who is not a practical sheet metal man, can do a first class job—a job that will be a credit to the heating trade. Such is the case in many places. I think this will result in the greatest hindrance to the heating business."

It is the experience of James McGonigal and Son,

IN the main, dealers and installers agree with manufacturers as to the most suitable conditions for the installation of a pipeless warm air heater.

For the most part, the men engaged in the actual work of installing furnaces have the advantage of practical experience. With comparatively few exceptions they keep in touch with the job after it has been completed.

If there are any complaints, they are the first to receive them. The manufacturer is remote. The dealer is on the ground. He gets all the facts in full detail, without any sifting and summarizing and toning down.

Consequently, what dealers have to say about the scope of usefulness of the pipeless, warm air heater is of utmost significance to the trade in general.

Loyal, Wisconsin, that buildings best suited for the pipeless warm air heater are houses without extended wings.

W. Covell and Sons, Waterloo, Iowa, answered the question tersely by saying: "Very small ones."

The one room house or a house having the effect of one big room, is considered the most suitable for the pipeless warm air heater by B. F. Stow, Wyanet, Illinois.

N. D. E. Richards and Son, Roanoke, Indiana, state that dwellings best adapted to pipeless furnaces are open houses, no matter how large, if the furnace is properly installed.

"Any kind of building that is open for the free circulation of air," is suitable for the pipeless warm air heater in the judgment of C. F. Bemis, Ruthton, Minnesota.

Frederick Y. Jensen, Ephraim, Utah, says: "I think the pipeless furnace is the only heating system for several reasons. First it is fool proof. You can fire it at any time. No water, no valves, no leaks, no bursting of pipes, nothing to worry about, yet it produces a circulation of air that can not be produced by steam or hot water heating systems."

A significant statement is made by W. H. Williams, Baltimore, Maryland. He says: "When heating with steam or hot water, the change of air from the cracks and openings of doors is considered sufficient. The pipeless furnace has convinced a large number of furnace heating contractors that it is not necessary to heat the cold air from the outside of the building and that large quantities of coal have been wasted by this old method."

"I use the Majestic Duplex System only," he writes, "and it has suited for all buildings that can be heated with a furnace."

D. D. Devore, Oquawka, Illinois, answers that dwellings of one story with plenty of openings between the rooms are best suited for a pipeless furnace.

One room stores or shops are considered most suitable for the pipeless warm air heater by Charles Hahn, Chicago, Illinois, who is well known to the trade locally under his happy slogan of "Hoot mon."

John A. Pontius, Geneva, New York, E. W. Leppla, Seaside, Oregon, Joseph Harmon, Duluth, Minnesota, and A. E. Packer, New Philadelphia, Ohio, say that the pipeless warm air heater is best adapted for a one room house.

"The pipeless furnace is best suited to any compact buildings with large openings between the rooms and open stairway," in the opinion of Prange-Geussenhainer Company, Sheboygan, Wisconsin.

C. L. Epps, Van Wert, Ohio, says that the pipeless warm air heater is not suitable for any building "as you can not get rid of the draft over the floor. If a man does not want a complete pipe job, then I try to sell him a three register job, one warm air register and two cold air registers, placed at outside walls. I have never had any complaints. I have changed pipeless jobs to three register jobs."

"I have no use for the pipeless furnace," emphatically declares W. F. Kasbohm, Van Wert, Ohio. "I use the Majestic heating system and that is a pipeless pipe job."

C. R. Oberhaltzer, Angola, Indiana, considers the pipeless warm air heater "best adapted to a house with colonnaded and large openings between the rooms."

Dwellings, stores, churches, and so forth, are all suitable for the use of the pipeless warm air heater in the opinion of A. R. Chandler, Sylvania, Ohio.

A building which is open throughout to permit a full circulation of air is best adapted for the pipeless warm air heater in the opinion of S. J. Pelz, Clinton, Wisconsin.

In conclusion it is well to call especial attention to the answer of the Campbell Heating Company, Des Moines, Iowa, namely, that "the occupant is a more important factor than the structural condition of the dwelling."

Therefore, it is highly important that the installer of the pipeless furnace give clear and explicit instructions regarding the best method of operation so that the householder may bestow intelligent care on the heater and thus derive satisfaction.

Well Known Furnace Men Form New Company.

One of the best known men in "Warmairheaterdom" is Walter Wimmer, President of the recently organized St. Louis Heating Company, manufacturers of "Home Comfort" warm air heaters.



Walter Wimmer.

Mr. Wimmer was for twenty-two years in charge of the warm air heater department of the Wrought Iron Range Company, St. Louis, Missouri, and as such had much to do with the progress which has been made in that industry during that period. He is also prominent in the councils of the Sheet Metal Contractors' Association of St. Louis and of the National Association of Sheet Metal Contractors, having served as President of the former and Trustee of the latter.

When last summer Mr. Wimmer had an opportunity to secure control of the patents, patterns, machinery, tools and good-will of the furnace department of the old company, he took advantage of it at once, organizing with two other men, also connected with this department, the St. Louis Heating Company, and in the six months which have passed since then, the new Company has demonstrated that the principles under which it does business are not only sound but appeal strongly to the local installer of warm air heating apparatus.

William A. Tooker is Vice-president and Secretary, and Henry Meisinger is Treasurer, and both are highly experienced in the manufacture and installation of warm air heaters, having occupied important positions with the old organization for twenty years or more.

The Work of the Research Bureau of American Society of Heating and Ventilating Engineers.

This Is the Last Public Address of John R. Allen, Director of the Research Bureau, Given a Few Days Before His Death.

Reprinted by Permission from the November Journal of the American Society of Heating and Ventilating Engineers.

This address by Director Allen of the American Society of Heating and Ventilating Engineers' Research Bureau, was presented at the opening meeting of Eastern Pennsylvania Chapter held at the Engineers' Club of Philadelphia, on the evening of October 14th. As this was his last public appearance prior to his death on October 26, 1920, and as his talk was characterized by many intimate touches of his wonderful and lovable personality, Eastern Pennsylvania Chapter has offered the following report of the meeting for the benefit of those of the membership who have been interested in the development of the Research Bureau in general and Director Allen's remarkable influence upon it in particular. The address was, however, extemporaneous and not given from notes. Therefore if any of his statements are found incomplete or obscure, correspondence is invited by the Publication Committee, in order that proper explanation may be made.

I am certainly very glad to have another opportunity to talk to the Eastern Pennsylvania Chapter. It is a real live Chapter and it is a pleasure to talk to such a Chapter.

The Research Bureau of the Society is a live subject and I am going to give you a resume of what it is doing and what it expects to do. When it was started at Pittsburgh, there were only a few offices. Now, we have three good-sized offices and a small laboratory, which the Bureau of Mines has just fitted up for us. We have a constant-temperature room just finished, and the Bureau has agreed to give us another room which they are going to provide for our refrigerating machinery. We have also now in use the larger laboratories down at the power house in connection with the experiments on large boilers, etc.

In our personnel at the Research Bureau we have Mr. O. W. Armspach, who was formerly with Dr. Hill of Chicago and Mr. F. C. Houghten, who was formerly connected with the Bureau of Mines, having charge of the heat transmission work in the Research Department; also a very excellent Secretary, Miss Eleanor E. Mellon. The Bureau of Mines is contributing the salaries of a draftsman and a designing engineer, and are about to offer the services of two more members of its staff as assistants. Therefore, before the end of the year, we expect to be very well equipped in the Bureau for our work.

The work of the Bureau is divided into two parts—the work in Pittsburgh and the work outside of Pittsburgh. The Committee has felt that the opportunities outside of Pittsburgh are very large; there are a great many laboratories in this country, largely in connection with colleges, that have had no very definite aim in

their work and we have been trying to coordinate them to assist us in carrying out this experimental work.

At the present time, we are carrying on at the University of Minnesota experiments on radiation losses from radiators; also some experiments on heat transmission. At the University of Michigan, we are carrying on a series of experiments on heat losses from pipes buried in the ground; and also experiments on friction losses in elbows and fixtures in the piping of hot water systems.

At Pennsylvania State College, we are starting some work on the heat transmission of building materials; this college has done a great deal of work along that line and the Bureau is cooperating with them and extending them their work.

We have been for some time trying to decide how to do that work; the previous method of determining heat losses has been the box method—after figuring on the box method and its accompanying troubles, we have determined to use the plate method, which is recommended by the Bureau of Standards at Washington. In our first experiments, we will use both methods, to find out which results are more accurate and more easily obtained.

At Rensselaer Polytechnic Institute, we are arranging to carry on experiments on the heat gradient through glass; also on infiltration and on our new ventilation standard.

At Yale University we are experimenting on the electric boiler method of testing radiators. Similar experiments are also being made at the plant of the American Radiator Company in Buffalo where they are building an equipment according to our designs.

At Minneapolis we expect very shortly to take up a very interesting series of experiments. The City of Minneapolis has built a school building in which there is installed the ordinary fan system of ventilation; then they will install in addition, the uni-vent system, the window system of ventilation, and the ozone system, each in different rooms; and we are going up there to analyze the results according to the ventilation standard adopted by the Society at St. Louis. If these experiments turn out at all satisfactory, I think we will have some very interesting data to discuss before the Society. We have long looked for an opportunity of this kind.

At the Bureau in Pittsburgh, we are starting work on infiltration of air through building walls and windows. We are also testing some boilers in accordance with the American Society of Heating and Ventilating Engineers' Heating Boiler Testing Code, in order to correct and perfect that Code. At the annual Meet-

ing, we will have some suggestions to make for refinement of the testing code.

We are also carrying on a series of experiments in connection with the Bureau of Mines on dust. You perhaps do not realize the importance of dust, because most of you are young, but as you get older you will, because most of us old fellows die of pneumonia; and dust is the reason for pneumonia.

The Bureau of Mines has already worked for about a year on this investigation and we are participating in it with them. We will take it up more in detail later as we arrive at some conclusion.

One of the things that I want to present tonight is the subject of ventilation. The Society, at its St. Louis meeting last May, took the most important step in its history in adopting a standard for ventilation—a thing the Society had been trying to do for 20 years. Now we have that standard before the Society, and I am not sure that all the members are familiar with the standard in detail and really know what it aims to do.

First, it might be well to state a few fundamentals regarding physiology, as I find in my travels that some people are not familiar with all the workings of the human system in connection with ventilation.

The very first thing we meet with in ventilation is that it has nothing to do with the chemical action in the lungs. As far as the chemical action of the lungs is concerned, you can neglect it.

A man's lungs will breathe anything within reason—they are wonderful apparatus in that respect. We breathe in our cities the dirtiest kind of air without any effect chemically. A man's lungs will stand concentration of carbon dioxide up to 500 parts in 10,000, when our former standard of ventilation used to be 10; we can therefore forget carbon dioxide as far as ventilation is concerned.

As far as the chemical analysis of the air is concerned, the air inside a room is chemically just the same as outside; we find practically no chemical difference.

A man is exactly like a steam boiler. He breathes oxygen in the air and eats carbon and hydrogen and unites those in the blood by a process called metabolism; and metabolism takes place throughout the entire system, so that a man's grate bars—his furnace where he burns the coal—is throughout his entire system.

After he turns that carbon and hydrogen into carbon dioxide and water (he doesn't form carbon monoxide but makes complete combustion), he carries it into the lungs where it is released, the carbon dioxide and water being taken out by the air, which he breathes, in the form of water and carbon dioxide.

Our lungs always contain about 400 parts in 10,000 of carbon dioxide—about 100 times the carbon dioxide that is contained in the air—and the air issuing from our lungs is practically saturated with water.

Thus, the principal function of the lungs is to remove the carbon dioxide and the water. A man does not breathe very much air; roughly speaking, he breathes about 22 cubic feet of air an hour. So far as the question of breathing is concerned, it does not take much air for a man.

The most important function is the control of temperature in the body; there is no function more ac-

curate in the human system than temperature control. If our temperature rises more than 5 or 6 degrees they put us in bed; if it rises 8 or 10 degrees they put us in a coffin.

Temperature in the human system is controlled by loss of heat in three ways: by radiation, by convection, and by evaporation.

The latter is the process by which most of the controlling is accomplished; that is, our radiant heat remains practically the same, but the evaporated heat varies very largely, and evaporation is produced by secreting moisture on the skin, which moisture is evaporated.

For the moisture to evaporate we must have proper temperature, humidity and circulation; so our temperature control is subject to three things: temperature, humidity and circulation, and those are the three most important things in ventilation.

We have, however, other factors such as germs. I might speak of dust first. Dust and germs go together. There is no such thing as an air-borne germ. All air-borne germs, so the physiologists tell us, are dust-borne, and the germs ride on the dust, and when we have high dust count, we have high germ count—almost always.

Odors are psychological, and, of course, anything that affects our psychology may affect our physiology. During the war the Bureau of Mines got up an odor that would make anybody sick at his stomach, so it will be seen that certain odors may affect us physiologically. We have not as yet, however, any good means of measuring odors.

Dr. Hill has a scheme, using limburger cheese solutions of different density and an investigator going into a room, smells the odor in the room and then the different solutions. But the trouble with a man's nose is that it has a "movable zero;" he smells with it for a while and after a certain period he doesn't smell an odor any more. So he has to establish a new zero point every time he takes a smell.

That is practically one of the most unsatisfactory features of ventilation, and the only way of reducing odors today that we are thoroughly positive of, is by introducing air that does not contain odors.

Dust is a very important subject. We are not giving near enough attention to it. We have been testing air at Pittsburgh every day of late, and incidentally we get about 4 parts in 10,000 of carbon dioxide on normal days; out in the country about $3\frac{1}{2}$ parts of carbon dioxide in 10,000 will be found.

The other morning we had one of those foggy days in Pittsburgh and got 7 parts of carbon dioxide in 10,000; that was followed by a still foggier day, when we got 8.1 parts in 10,000, which was more than I thought ever occurred in natural air.

When we tried to get a dust count, the plate showed nothing but a smudge of dirt; which we could not count. That is the condition of the Pittsburgh air, and most cities in the East are about as bad as that, and that is what is killing the inhabitants of the cities by pneumonia.

Of course it does have an effect on tuberculosis, but I doubt if it has nearly as much effect as on pneumonia.

If most of the people of the United States are going

to insist on coming into the cities to live, we will have to take care of their health.

We have Commissions to investigate the water supply of the city, but we can go without water for a long time—24 or 36 hours. We have Commissions also to investigate food, but we can go without food for 60 days or over.

However, we can not do without air for 5 minutes without becoming a dead one, so our air is more important than our food and water, yet we give no consideration to air.

We do not know enough about it; but there are a great many agencies at work at the present time that are making very careful investigations of air conditions.

I now desire to present in Figure 1, a chart prepared by the Board of Health of Chicago, which I think was originally the work of Professor Sheppard, devoted largely to the effect of wet and dry bulb temperature and movement of air. If we take a room at 70 degrees Fahrenheit with a wet bulb at 60 degrees, it shows a percentage of humidity between 50 and 60 per cent—about 55 per cent.

What we are really concerned with is only wet bulb—a man is a wet-bulb thermometer, and he is only concerned with the wet bulb, so far as comfort is concerned.

The dry bulb does not tell us anything about comfort. We can perspire in a room with a temperature of the air at 65 degrees, or we can be cold at 80 degrees if we have the right humidity. When we say that the temperature of a room should be 70 degrees it does not mean anything. It should correspond with the humidity, and has nothing to do with the dry bulb temperature.

This chart is made from experiment. With no air movement and with a man at rest, 56 degrees is a comfortable temperature; but as the air movement increases and gets up to 320 feet, we can go to a temperature of 63 degrees and still be comfortable by the wet bulb.

As a man does more and more work he is comfortable at lower and lower temperatures; that is due largely to lung action.

Dr. Henderson of Yale has lately been making a series of experiments on the effect of carbon dioxide in connection with the New York and New Jersey tunnel.

That work shows that when a man is at rest, he breathes a certain amount of air, but when he goes out and takes a walk he breathes almost twice as much; and that when a man is working actively he breathes one and one-half times as much as when at

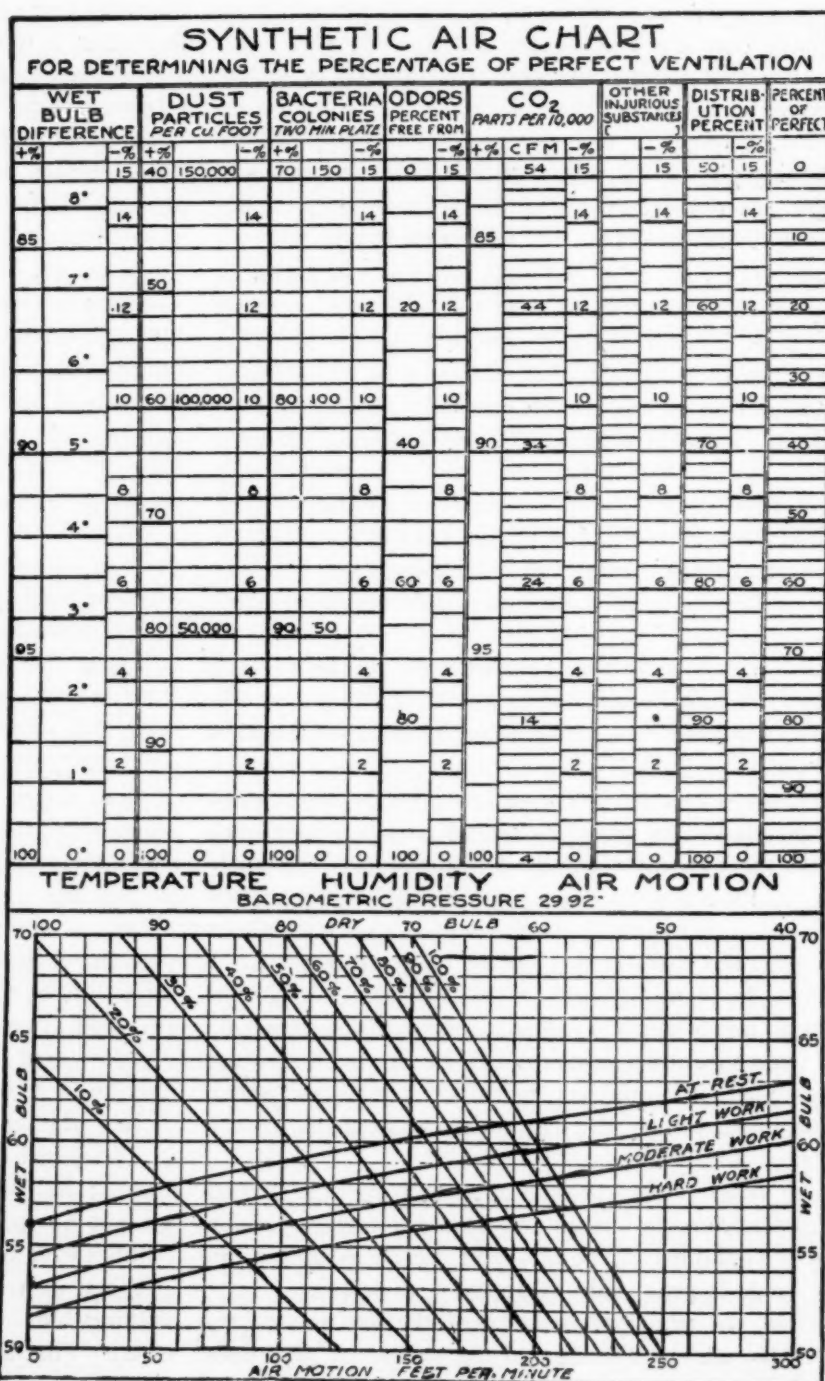
rest. That is why he can stand high wet-bulb temperature.

If a man is doing light work and there is an air movement of 150 feet, the wet-bulb temperature is 59 degrees. That is a degree too high—higher than it ought to be by a little more than 1 degree.

Dr. E. V. Hill, President of the Society, has devised the scale in the Synthetic Air Chart which is now the Society's standard for measurement of ventilation.

In this 1 degree in temperature means a penalizing of $1\frac{1}{2}$ per cent; if 2 degrees too high the penalization is a little over 1 per cent, as may be seen in the lower part of Figure 1.

There is also a scale of penalizing for excess temperature above the temperature for comfort. In the



same way, there is scale penalizing for dust particles, starting with no dust particles at all, and when you get up to say 10,000 dust particles which is about normal, there is about 1 per cent penalization.

We have the same form of penalization for bacteria colonies and odors, according to Dr. Hill's scale of odors; and there is penalization for carbon dioxide that was put in because the carbon dioxide shows changes of air. We measure the number of air changes by means of carbon dioxide.

We have also penalization for other vapors where we allow four parts in 10,000 of carbon monoxide for a period not exceeding one hour in the tunnel, and for longer periods you can stand pretty close to 4 in 10,000. This, of course, must be a particular table.

We have next a system of penalization for distribution. The distribution is determined by taking standards in the room.

We take the temperatures at four or five points in the room and we determine the averages of carbon dioxide in the room. Then we take a sample for each average and average the variations, which taken in the per cent column of penalization shows the lack of distribution.

The only difficulty for the engineer is the fact that carbon dioxide in small quantities is very difficult to determine.

We have been testing carbon dioxide at the Research Bureau for a while and find that it takes a lot of experience to do it. We test with an apparatus that is about as delicate as a baby.

When we get used to it, it works pretty well. What can always be done is to have more standard laboratories like ours at Pittsburgh, where samples can be sent and samples of these kinds are taken the results can be determined.

All these penalizations are added together and if they total 15 per cent, we have 85 per cent of perfect ventilation. Thus by means of this standard we are able to calculate for every room the percentage of ventilation.

This is, of course, only a beginning; we may have corrections to make; we may find it necessary to give these qualities different weights, but until we get more information it will have to stand as it is. The Research Bureau is doing everything it can and as rapidly as it can to perfect this standard of ventilation.

Another question that has come up is the relation of comfort to temperature. Dr. Henderson in his work at Yale University, on temperatures, has shown that a continuous temperature is not desirable.

He shows that we want to change the temperature once in a while; it is a good thing to give a man a little jar. Places like the Hawaiian Islands, Cuba and other island countries where they have almost uniform temperature the year around, are not healthy climates.

On the other hand, very low temperatures, such as in northern Canada, are not healthy. After a long period of work in that connection Dr. Henderson has written a book on that subject; he has come to the conclusion that climates such as New York and Seattle are about the best climates for health in this country.

He says that high humidities are much more conducive to health than low humidities; in other words, that dry climates are not healthful and that the best climates for health are the damp climates.

He goes as far as to recommend a humidity as high as 80 per cent. Of course that is impossible, but the

more humidity we have the better the result, and we want the sudden changes which energize our skin.

A skin that always functions just the same becomes inactive; and the skin that has to make sudden jumps is conducive to health.

DISCUSSION.

Lee Nusbaum: I should like to ask Director Allen if when they made the experiments on CO₂, any attempt was made to take into account the effect of the sun's rays on the air.

John R. Allen: Well, on sunny days we ought to get pretty low CO₂ content, but in Pittsburgh we do not always have sunshine when there are no clouds.

Lee Nusbaum: Doesn't that account for the fact that on a foggy day you have a high content of CO₂?

John R. Allen: The reason we have a high CO₂ content is because on the foggy day the air is light; otherwise the fog would rise. That very fact shows that the air is extremely light. On all those days we had very little air movement, so that there was no tendency of the wind to carry the carbon dioxide away.

Lee Nusbaum: Have you thought of making experiments with regard to heat curves of sunlight through glass? That is a very important question.

John R. Allen: We have not gotten any yet, but it is a very important consideration, because the sun has a tremendous effect.

Lee Nusbaum: The only record we have now is from the Bureau of Standards, which is not what it should be.

John R. Allen: We know very little about it, but it is a very important consideration. The heat from the sun's rays is undoubtedly very high at times. It depends entirely on the angle of incidence, and it makes a great difference what the season of the year is; it is a very complicated problem.

Norman Sherrerd: Have you found that your results from experiments on heat loss in glass vary considerably whether the glass is smooth or rough?

John R. Allen: We know very little about that. In going over all the experiments made on glass we find that the physicists have not told us what the conductivity of glass is. I wrote to the Bureau of Standards, and although they can tell us about the diamond and mother of pearl, they can not tell us anything about glass. I have some results which show that the conductivity of glass may vary as high as 100 per cent for different kinds of glass. When making experiments on glass we have to know the glass mixture; we have to have a chemical analysis of the glass. It may be possible to make a glass that is going to lose less heat. There is no question that the thickness is a very important item.

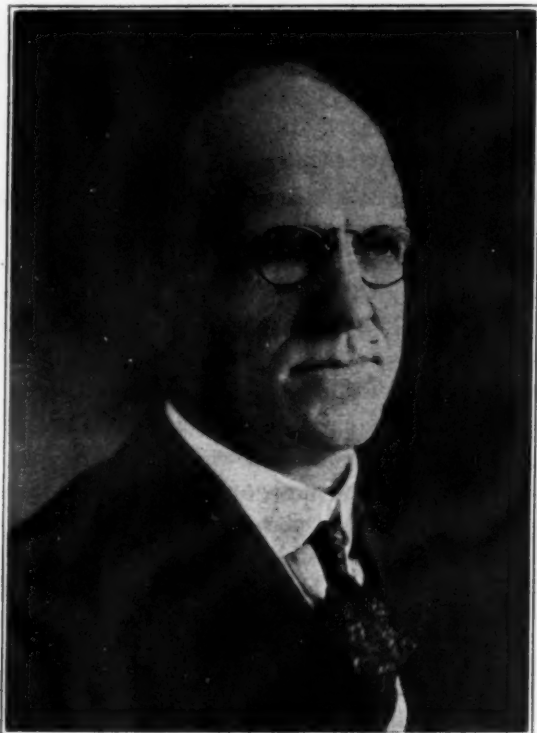
A. H. Woolston: I should like to ask your experience on the effect of moisture in concrete buildings during the first year in connection with heating installations.

John R. Allen: My experience is that it takes a lot more heat to heat them. The first year they can not get any heat, the second year they do better, and about the third year they begin to get satisfactory results. We had that problem on one of the university buildings, which was a concrete building, and it was not until the third year that we got satisfactory results.

A. H. Woolston: What would be the percentage of the loss the first year?

John R. Allen: I do not know. I am going to make such experiments in another university. We have had the walls dried out all summer; we expect to make experiments on different thicknesses of walls. We do know that the conductivity of concrete is very high. It is a very difficult form of building material to use from the standpoint of the engineer.

One thing that must be impressed on the people of this country is that we should build real houses. I was tremendously struck with that question in moving from Minneapolis down to Pittsburgh. In Pittsburgh, we have a mere "shed"; at Minneapolis we had a real house. In Minneapolis they build houses with plaster, studs, sheathing and insulating material and then cover it with paper and clapboards. Thus they have houses with fur overcoats on them and every window from



The Late Professor John R. Allen, Director Research Bureau American Society of Heating and Ventilating Engineers.

attic to cellar is a double window. At Minneapolis, I burned less coal for heating with the thermometer at 30 degrees below zero than in Michigan with the thermometer at zero. With high-priced coal, we should build houses to correspond. It costs very little to put on that insulating material, and its cost can be saved in a couple of years by reduction of coal bills.

It pays to use the double windows; for they save all this trouble with moisture on the glass. The humidity can be run up very much higher without the disadvantage of moisture and frost on the glass, which is very objectionable to housekeepers. The people in the milder climates will have to learn to use double glass. This Society should stimulate the building of better houses, so that they will not have to put in such expensive heating plants and burn so much fuel, which is a waste of money.

David Knickerbacker Boyd: I am very much interested in what you say about building construction and

outside walls. I am a member of the Bureau of Standards Plaster Conference, and we have a question we should like to settle, that is to recommend the plastering on exterior walls should invariably be on furring. I think that perhaps on the Pacific Slope it would not be necessary to require a furred wall—that the plaster might be applied directly to hollow tile or concrete or whatever the masonry of the exterior wall should be, but it is the general consensus of opinion that in all parts of the country, the wall should be furred.

John R. Allen: I have not made any experiments but my experience is they should all be furred. Moisture penetration is very much reduced by furring and the heat transmission is tremendously improved by furring. This Society has a record of coal burnt in various localities and we found more coal burnt per room in Texas than in North Dakota. In the milder climates more coal is wasted than in the cold climates. For instance, there is a bigger wastage of heat in Georgia than in North Dakota, South Dakota and Montana, where they really save heat, and it would surprise you to see how little radiation is used up there. They use less radiation in Minneapolis than in Philadelphia, and also smaller boilers, and they get better results.

A lot of heat loss is due to absorption of heat radiated by the walls. We have had that problem in connection with a large auditorium; we used to let the temperature run down to 40 degrees and then, when we were to have a meeting, we would raise it by the fan system to 70 degrees. But the people could not sit in that room; they would freeze to death because everything in the room was still cold, and the radiation of the heat from the body was absorbed by those objects which were still cold. We found we had to run those fans about 5 hours instead of 1. If we want comfort in a room we must have warm walls, and warm walls are produced by first class building construction. In addition to comfort there is a marked saving effected in fuel consumption.

W. G. R. Braemer: It might be interesting to say that we have at the present time some work in connection with a reinforced concrete building in which there are 300,000 square feet of floor space. A very large portion of the walls have double-sash windows with wired, dull-faced glass, so that every precaution toward minimum heat loss is taken.

Lee Nusbaum: Do you think that the effect of the double glass helping the amount of heat radiated is due to the circulation of the air or the double thickness of the glass?

John R. Allen: The double thickness of the glass very largely. Of course the more we insulate from the outside air, the less heat loss we will have. We can cut the heat loss about 40 per cent. That is about the figure we have obtained from actual experiment, and, necessarily, we reduce infiltration to a marked extent. We are just experimenting now on infiltration, and while I do not dare say anything because the experiments are too new, apparently infiltration is a very large item—a very much larger item than we had any idea of. And when we talk about the amount of air change per hour, we have not come anywhere near it in

a modernly constructed room. What we are going to get in the ordinary "barns" that are built for houses in this part of the country, I do not know, but we will know before the winter is out.

A Member: I should like to ask if you have any idea about the percentage of the sun's effect that would be diverted by having white shades.

John R. Allen: Well, a good deal will be diverted, but I do not know how much. I know the reverse proposition, because I have tested it where the shades are drawn on the inside to retain heat. Drawing a single shade close to the window cuts down the heat loss about 20 per cent. When one shade is drawn close to the window and one outside the sash, that cuts down the heat loss of the window about 40 per cent, so that the shades have a very marked effect.

A member: I thought that the white shade would have a tendency to reflect the sun's rays.

John R. Allen: It would reflect a number of the sun's rays, but how much I do not know. That experiment has never been made by us.

A Member: In your double window do you mean two thicknesses of glass, or a storm sash?

John R. Allen: Storm sash.

Wm. C. Miller: How do you overcome in this territory the objection of the difficulty in opening the windows, which comes up whenever storm sash is recommended?

John R. Allen: What they do in the northern climates is to have the storm sash hinged at the top, so as to hook over, and then they use two little adjustable rods at the side, so that the sash can very easily be thrown out in weather that they do not need them closed. Most people are crazy about opening windows at night. I do not know why they open them. It certainly is not to get better air, because the air outside and inside is just the same. The only reason I can see is to get circulation, and they get it at big expense. That is all the windows are opened for.

W. G. R. Braemer: Perhaps it is difference in temperature?

John R. Allen: That may be part of it; but, on the other hand, when we expose ourselves in a room at zero temperature we can not rest as well because at zero it takes about 10 per cent to heat the body and carry it out of the lungs. The lungs are then about three times as active than when sleeping in a warm room. The only reason we open the windows is to make the skin function. But when we have a very cold room we put a whole mass of blankets on top of us and just why we have had this big campaign for fresh air and wasting coal I do not know.

Thornton Lewis: I should like to bring out the fact that Dr. Allen with his usual modesty, has passed over this question of the New York and New Jersey Vehicular Tunnel. I think that that is one of the greatest opportunities for service that has come to this Society since its formation. It is one of the greatest compliments that the Society has received, that the Commission handling this tunnel should come to us and ask for the services of Director Allen (recognizing his ability) as an engineer. The Research Committee looked at the proposition as a tremendous opportunity for public service.

We understand that there are in contemplation other tunnels in the country, one of them probably in Chicago, and this one in New York is going to be watched very closely. I rather suspect that before they get very far with this tunnel all their preconceived ideas on tunnel ventilation are going to be upset by Professor Allen, just as he has upset all these other old theories that we have had. I think we all realize that this particular proposition is a great thing and we may congratulate ourselves that this Society, through Professor Allen, is able to render such a big public service; for, after all, that is the biggest work that this Society can do—to render public service.

The Chairman: I think we all, after hearing Director Allen, realize more than we ever did before the breadth of vision and the clear mind with which he approaches this whole question without attempting to prove any of our pet theories and arriving at the exact facts.

Shortage of Dwellings Has Not Retarded Furnace Output.

From first consideration, it would seem that the shortage of dwelling houses so acutely felt throughout the country would have an unfavorable effect upon the volume of warm air heater production.

Comparatively few new dwellings have been built during the past year. In view of the fact that warm air heaters are designed for installation in dwellings, the inference would appear to be valid that less warm air heaters are bought and installed.

The facts, however, run quite to the contrary.

Practically all manufacturers of warm air heaters who have responded to the question bearing upon this point put to them by AMERICAN ARTISAN AND HARDWARE RECORD declare that the shortage of dwelling houses has had no appreciable effect upon the volume of warm air heater production during this year.

One warm air heater manufacturer of the Middle West explains the apparent contradiction by saying that "the cost of new construction has stimulated the remodeling and improving of old houses which compensates the situation."

A well known Ohio company reports the largest production of furnaces during this year in its entire history.

Similar reports come from many other industrial centers. Indeed, quite a few manufacturers declare they have had a demand for more furnaces than they could make during the period under discussion.

Generally speaking, the experience of the Wells Furnace and Supply Company, St. Louis, Missouri, has been duplicated throughout the trade, namely: "The demand for betterments and renewals on old houses has for the past three seasons exceeded all previous records, and for these the comparatively moderate cost of warm air heat had been attractive to owners."

Undoubtedly, the heavy advertising of pipeless furnaces has served to stimulate production and perhaps to some extent has curtailed the production of heating stoves in certain territories.

More Cooperation Between Manufacturers and Dealers Is Essential to the Warm Air Heater Trade.

For the Good of the Trade, Furnaces Should Be Retailed and Installed by Legitimate Dealers and Installers.

No human relationship is perfect. We have equations in mathematics. In theory, it is possible to get perfect balances.

In practice, however, there is always some tilting of the scales.

If perfect cooperation between manufacturers and dealers could be achieved, ideal conditions would prevail in the trade.

But circumstances are constantly changing.

Methods, materials, markets, and men are always undergoing modification. Therefore, there is need continuously of renewing the efforts of yesterday and devising new plans to meet the problems of today.

Imperfections there are in both classes. The nature of one's economic interests determine one's character and angle of vision.

To obtain perfect harmony of action between manufacturers and dealers, it would be necessary to make their business absolutely identical.

This, of course, is not within the range of possibility.

However, it is possible and practicable to find a big percentage of things in which the interests of the dealer and the interests of the manufacturer are one.

Both are concerned with the making of profit.

Both know that in order to increase profits, sales must be multiplied.

The dealer, as well as the manufacturer, is more or less sharply aware of the necessity of quality and satisfaction to permanency in business.

The main difficulty in the warm air heater industry arises from failure to perceive the consequences of snatching at present profits to the detriment of future business.

To be more specific, there are hundreds of cases in which dealers and installers have yielded to the allurements of quick profits from some contractor and have installed furnaces on contract jobs which were not big enough to meet the requirements of the dwellings in which they were placed.

This, of course, implied lack of foresight—not only on the part of the installer but, in many instances, on the part of the manufacturer who supplied the furnaces and who knew, or ought to have known, that they were being installed in dwellings whose cubic ca-

capacity required furnaces of larger size.

Manifestly, this is not the kind of cooperation which makes for the betterment of the trade.

Cooperation between dealer and manufacturer is possible and practicable only by seeking out and becoming thoroughly convinced of the advantages of exploiting the things which both dealer and manufacturer hold in common—exploiting them not in an evil sense of the word but for their own good and for the service of the people. In this direction lies genuine profit and sound trade development.

Criticism is easy—especially the criticism which involves fault-finding.

Instructive criticism which analyzes the weaknesses and supplies remedies for them is the kind of criticism which is most needed.

In the matter, then, of cooperation between manufacturers and dealers the first big fact to keep in mind is that, under our present ways of commerce, the best and most economical service in the distribution of commodities is through the dealer.

Many answers have been received through the questionnaire sent out by AMERICAN ARTISAN AND HARDWARE RECORD from furnace manufacturers. One of the most important questions asked is: "What in your judgment should be done to strengthen the cooperation between manufacturer and dealer?"

A leading Illinois manufacturer gives his answer in a nutshell as follows: "The organ-

ization of each and mutual understanding."

The Majestic Company, Huntington, Indiana, declares: "One, of course, could write a book on the subject. However, personal touch by both salesman and salesman with the dealer and the yearly dealers' conference will do the most to strengthen the cooperation between manufacturer and dealer in our judgment."

In the opinion of the Excelsior Steel Furnace Company, Chicago, Illinois, some things required to strengthen co-operation between manufacturer and dealer are: "The joint study of the proper planning and installation as well as operation of warm air heating plants. The National Warm Air Heating and Ventilating Association should, we think, aid the

IN matters which are not of first importance the dealer and the manufacturer can agree to disagree. Cooperation does not imply any loss of independence nor sacrifice of essential rights.

It means that dealer and manufacturer work together in the promotion of the interests which they have in common. It does not signify that the dealer must subordinate himself to the manufacturer, nor that the manufacturer should modify his business methods in response to every complaint, no matter how trivial.

The innermost secret of co-operation lies in friendliness. This is only another way of saying that service is at the basis of all business and of every forward movement of civilization.

dealer through a competent engineering committee, which should formulate simple rules of installation which will insure at least fairly successful results in the average home. Such a committee might possibly use its influence in securing the elimination of the mail order and maker-to-user type of apparatus which is no credit to the furnace industry."

A Canadian manufacturer gives it as his judgment that: "Many of the dealers are following the line of least resistance; and the manufacturers who spend the largest amount on advertising should reap the most benefit. Generally speaking, advertising and working through the dealer on the prospect have been effective."

The advice of an influential Western manufacturer is: "Prove to the dealer that the help furnished by a manufacturer is for his benefit and that he is rendering a service to the public when he coöperates with the manufacturer."

An Ohio manufacturer of warm air heater appliances frankly affirms that: "The manufacturers themselves, many of them, need education in sales and installation. If competent to advise, they should not sell to dealers who insist on using too small sizes or make improper installations. The manufacturer can effectively coöperate with the dealer and secure satisfactory installations if he will, but most of them sell the dealer and let it go at that—paying not so much attention to educating the dealer to make proper installations."

Roger Keith of Des Moines, Iowa, speaks out of a fund of many years' experience in manufacture when he says: "Let the manufacturer pay for an intelligent educational campaign about furnaces and about the retail trade in general for the benefit of the consumer. When the buyer knows something outside of prejudice and the worst price cutter in the town, better furnaces will again be common and a better all-around feeling will be noticeable to the trade. But the manufacturer must lead the way as he is the only one with enough vision and intelligence to fight the causes of the trouble."

"Incessant propaganda" is the method suggested by the Wells Furnace and Supply Company, St. Louis, Missouri. "Convince the dealer by practical demonstration that furnaces are the most needed commodity and, but at present, the least known to the buying community. When dealers and contracting mechanics realize the importance of the trade to be gained, the agency for a good furnace in any prosperous or wealthy community will be regarded as a valuable asset and enterprising salesmen will take the trouble to advertise furnaces to their householding customers. Work with the country dealer and make a sale or two for him. Instruct his mechanic in the first installation or two. Then figure his jobs for him from diagrams which he can send in. After a few sales, he will go ahead on his own steam and surprise himself. Get him to trade a furnace to his country newspaper for advertising. Furnish the cuts and write advertisements for him. Get busy on the job and you will start something."

Briefly put, the Huron Furnace Company, Huron, South Dakota advises: "Do not profiteer. Give the

dealer a square deal and make no promises that are not fulfilled."

A prominent Western manufacturer of warm air heater accessories offers the following advice: "If some plan of cooperative advertising could be worked out whereby the expense to the manufacturer and retailer would be a nominal consideration, we believe it would do much to strengthen the cooperation between the two. Only as a retailer succeeds can a manufacturer hope to succeed and anything that will bring them closer together is of importance and value."

I. M. Adams, Manager Furnace Department, Favorite Stove and Range Company, Piqua, Ohio, says: "If there is any general, workable rule, general in its application, we would like to know of it. Almost every case of cooperation resolves itself into an individual case, to be solved according to the necessities of the occasion. The greater the cooperation with the dealer the greater the expense to the manufacturer, and naturally, these costs must be taken into consideration. The answer to this question is wholly a question of sales policy that must be individually applied."

In the judgment of the Edwards Heating Company, Wellsboro, Pennsylvania: "The dealer should tie to one manufacturer if the manufacturer has a good product. He can not do justice to his heating business with several makes of heaters. Let him tie to a good heater and back it up and he will get all the business he wants."

There is wisdom in the advice of the May-Fieberger Furnace Company, Newark, Ohio: "Become acquainted with the dealers personally. Have them into your factory. Endeavor to show the dealer you are always trying to coöperate with him, and at times conditions make it impossible to render help that the dealer might think very easy. Endeavor to have the dealer stand on his own feet regarding complaints, etc., and not turn every little task over to the home office."

Campbell Heating Company, Des Moines, Iowa, declares that: "The dealer should confine himself to one line of furnaces and then expect much valuable help from the manufacturer. He can not expect much from several manufacturers when he is loyal to none."

F. L. Nesbit of the Standard Furnace and Supply Company, Omaha, Nebraska, maintains that: "The manufacturers should sell to legitimate heating trade only, and the would-be legitimate manufacturers should stop selling the so-called pipeless furnaces to the corner drug stores, dry goods stores, department stores, and such like, who advertise for salesmen to sell these goods but do not want the experienced heating salesmen who usually advertise to have people call and get the information from their heating engineer."

"We believe also that the legitimate heating trade should buy goods only from manufacturers or jobbers who sell only to the legitimate trade. The retailing and installing of furnaces should be in the hands of people familiar with the business."

"The policy of selling tonnage should be changed to that of selling real heating plants to legitimate dealers who can and will install them properly."

From the foregoing views on the subject, it is quite

evident that the factor of the utmost urgency in promoting cooperation between manufacturers and dealers is the kind of assistance which train the dealer in effective salesmanship. This assistance can be and ought to be friendly and not patronizing.

Spends Half a Century in Making Homes Cozy.

Making homes cozy and pleasant has been the work of the Co-Operative Foundry Company, Rochester,



Frank M. Brayer, President, Co-Operative Foundry Company, Rochester, New York.

New York, for more than fifty years. It would require more space than is available in the average trade journal to set forth in detail the speculations which suggest themselves regarding the ethical value of such work.

The family is the basis of the nation. Keeping the family together is largely a matter of keeping the home agreeable—physically, first, and then temperamentally and morally.

No one will deny that it is easier to observe the amenities of life and the laws of the land

when things are comfortable than when conditions are disagreeable and irritating.

The Co-Operative Foundry Company was organized June, 1867, by Nicholas Brayer, the father of Frank N. Brayer, who is now its president. Associated with Nicholas Brayer in the formation of the Company was Edward W. Peck.

The stove foundry business of the Company, however, goes back to a much earlier date. This part of the production of the Co-Operative Foundry Company is an inheritance from the John M. French Foundry Company, of which Nicholas Brayer was foreman.

Upon its organization, the Co-Operative Foundry Company took over the plant of the French Foundry which it operated until a few years ago, maintaining it as a branch plant for many years after its present factory on the southwest corner of Lincoln and West Avenues, Lincoln Park, Rochester, was built.

As its name indicates, the Co-Operative Foundry Company started originally with its employes all owning stock in it. But today the stock is held by the families of the former employes.

More than \$1,250,000 worth of furnaces, heaters, ranges and other kinds of stoves are being produced at the Lincoln Park plant of the Company this year.

Between 8,000 and 9,000 furnaces are produced by

the Company every year and it is a reasonable statement to make that more than one million persons are living in quarters warmed by heating apparatus manufactured by the Co-Operative Foundry Company.

Moreover, the manufacture of pipeless furnaces has grown into such big proportions that 5,000 of those heaters have been made this year by the Co-Operative Foundry Company.

A visit to the Lincoln Park plant of the Co-Operative Foundry Company, Rochester, New York is instructive. The plant consists of six major buildings and a few smaller ones with a combined floor area of 300,000 square feet. The Company employes about two hundred and fifty men.

A branch agency is maintained in Chicago and the Company has an agency in Holland which cares for the prosperous European business.

Everywhere at the plant are seen improvements and labor-saving devices.

In a walk through the cleaning department, one is surprised to find the air free of dust and offensive odors.

This is due to a suction system which carries all foreign substances and disagreeable odors to big pipes to large arrestor rooms.

The dust is caught in cheese-cloth screens. These are vibrated by air at intervals and the dust is shaken down into hoppers underneath from which it is removed on to wheelbarrows and carried away for final disposal.

Visiting the factory, one can see copper or cast iron reservoirs, registers, fire box linings, grates, doors, flues, radiators, cold air boxes, asbestos-lined jackets and other parts of furnaces and heaters and stoves in process of manufacture and assembly.

The galvanized iron sheeting which forms the sides of the furnaces is cut as desired by great shearing machines. It is later creased and worked into shape by other machines.

One ingenious tool found in use at the plant is an electric two-ton truck. This is run under platforms holding a ton or more of raw materials, finished products, or other things to be moved. The platform is raised or lowered by an electrical control so that it is really a powerful jack.

During the coming year, the Company intends to build and equip a new engine room and to place individual motors on all its machines and do away with overhead belts and shaft lifts.

The Cash Customer Is Always Best Satisfied.

There is ample warrant in the general experience of installers for the statement of H. T. Maring, Gettysburg, Pennsylvania, that, "the cash customer is always best satisfied."

John R. Jones, Ames, Iowa, writes: "Out of three hundred furnaces sold in four years, three were sold on credit and they are the only three that 'do not work fine'."

"I know from experience that after settlement is made we rarely have any complaint," says O. H. Neuenfeldt, Enderlin, North Dakota.

Better Service on Gilt Edge Furnaces than Ever Before.

By Henry E. Schwab, Vice-president and Treasurer R. J. Schwab & Sons Company, Milwaukee, Wisconsin.

The several additions to the Gilt Edge plant, though to a casual observer they are the most apparent evi-



Henry E. Schwab, Vice-president and Treasurer R. J. Schwab & Sons Company.

dences of progress, are but a small part of the efforts of the R. J. Schwab & Sons Company, Milwaukee, Wisconsin, to keep pace with the trade demand for Gilt Edge furnaces.

This has been from the outset a strenuous effort to serve: constant planning to do more than it had seemed could be done; nerve-racking trials to overcome the obstacles of insufficient materials and incompetent help.

It has been a trial to refuse to sell Gilt Edge furnaces to new dealers inquiring of the salesmen and the main office, but the company has consistently adhered to the Gilt Edge policy of loyalty to Gilt Edge dealers who had been loyal to the company, and has maintained that such dealers rightly had the first claim on the furnaces they were able to produce.

They are very pleased to announce that with the greater space and the new facilities and methods, they are getting better and better production and they want their friends to know that they are now again giving real Gilt Edge service and in 1921 will be doing so from the very first day.

They will therefore take care not only of the past customers but also of new customers and will give them better service on Gilt Edge furnaces supported by more effective selling assistance than ever before.

If you have not received a copy of the attractive new Gilt Edge Liberty Furnace Hanger, write to R. J. Schwab & Sons Company, Milwaukee, Wisconsin, and they will gladly mail you a copy.

Changes Its Selling Policy.

The Marshall Furnace Company, 14 Dobbins Street, Marshall, Michigan, are not only manufacturers of the Marshall Wolverine Superheaters but are an organization of heating engineers.

They have been selling their product direct to the consumer for the past 40 years.

They have outgrown this method of doing business, however, and are changing their policy and giving dealers in different parts of the country the advantage of their long years of experience.

They are retaining their corps of 100 heating experts so as to give the dealers the close personal co-operation necessary to enable them to build a large and profitable furnace business.

The Marshall Furnace Company makes both pipe and pipeless furnaces different in construction from any other furnace manufactured.

It would be well to communicate with them immediately with reference to exclusive sale on their well known Superheaters.

All inquiries should be made direct to the Marshall Furnace Company, 14 Dobbins Street, Marshall, Michigan.

Company Keeps Same Personnel or Many Years.

By E. S. Moncrief, Vice-president The Henry Furnace & Foundry Company, Cleveland, Ohio.

The Henry Furnace & Foundry Company, Cleveland, Ohio, is the manufacturer of the Moncrief Warm



E. S. Moncrief, Vice-president The Henry Furnace & Foundry Company, Cleveland, Ohio.

Air Furnace which has enjoyed an enviable reputation for over twenty years.

The personnel of the Company has remained practically unchanged through these many years and it is this fact that gives the trade confidence in their dealings with us and our product.

When the Moncrief Furnace was first manufactured it was made in only one style. Now we have six, namely, the "A," "B," "500A," Pipeless, Three Pipe, which can be made from any series, and the

Schoolroom heater, which also can be made from any series.

In what now appears to be the Pipeless Age the Moncrief Pipeless Furnace is taking its place, the same as all other Moncrief furnaces in various styles have in the past.

In addition to the manufacture of furnaces, we make tin and galvanized pipe and fittings. In fact we carry a stock or make everything essential for the correct warm air installation.

Every man who is getting \$10,000 a year has at least convinced somebody he is worth it.

Develops from a Small Tin Shop to a Great Institution.

From a small tin shop to a great institution within the span of a single lifetime is the encouraging history of F. Meyer and Brother Company.

Equipped with a thorough knowledge of the tinner's trade, a willingness to work, and a determination to win, Frank Meyer started a very modest tin shop in 1866 in a building adjoining the present store and office of F. Meyer and Brother Company, Peoria, Illinois.

In the course of a few years, he added a small stock of stoves, tinware, and house furnishing hardware.

The business flourished. Soon in order to help him carry the increasing burdens his brother, Dirk Meyer became associated with him.

The firm was then known as F. Meyer and Brother.

In 1892 the business had grown to such proportions that it was deemed advisable to organize it as a stock company. The original incorporators were Frank Meyer, Dirk Meyer, George F. Meyer and George Harms.

In addition to their constantly expanding hardware and sheet metal business, they began the manufacture of the Weir Furnace, purchasing the original patents, etc., from the Weir Furnace Company, Des Moines, Iowa.

This branch of the business developed to such an extent that it was decided to organize a separate corporation properly to take care of the manufacture of the furnaces.

Accordingly, in 1894 the Meyer Furnace Company was incorporated by the same men who incorporated the F. Meyer and Brother Company.

In 1896 the manufacture of the "Handy Furnace Pipe" was started. The factory for this purpose was originally in a little room about 30 by 30 in the rear of their tin and cornice shop, employing one man and helper.

This business increased so fast that within two years an addition was built to the shop making a two-story building 50 by 83 for the manufacture of furnace pipe. Two years later, fifty feet more were added to the building.

Two years later the capacity of the building was again doubled and several years later a third story was placed over the entire structure covering a ground space of 83 by 175.

The entire building was destroyed by fire in September, 1914. The Company then purchased the present factory building at 916-918 South Washington Street, Peoria.

In 1916 this building was again enlarged by adding two stories to it. From present indications, other additions will soon be necessary.

Frank Meyer, who started the business in 1866, died in 1911. Since then the officers of the Company have been George Meyer, President; Dirk Meyer, Vice President; W. E. Look, Treasurer; and George Harms, Secretary.

To carry on their growing business, it became necessary to establish jobbing interests in different parts of the United States. First of these was the Standard

Furnace and Supply Company, Omaha, Nebraska. Later on came the Meyer Furnace and Supply Company, Kansas City, Missouri, and the Rock Island Register Company, Rock Island, Illinois, the Northwestern Furnace and Supply Company, Minneapolis, Minnesota, Manny Heating Supply Company, Chicago, Illinois, The Dunning Heating Supply Company, Milwaukee, Wisconsin.

These companies are not branches or parts of F. Meyer and Brother Company, but the development of the furnace pipe industry, and the spread of this business has had much to do with their beginning and continuance.

In most of these companies, one or more of the stockholders of F. Meyer and Brother Company are stockholders.

Another industry that has grown out of the original little tin shop, and later on, manufacturing of furnaces, is the present Victor Foundry Company, covering a large plat of ground in East Peoria, where the castings for the Weir Furnace are made.

Although not connected with F. Meyer and Brother Company, its direction and management is largely in the hands of the same people.

Considering the very modest beginning in 1866, in 1920 this has grown to a large and varied industry, using great quantities of tin plate, sheet metals and pig iron.

The manufacture of all of this is conducted in their Peoria plants and distributed throughout the United States by a large number of jobbers in addition to those directly connected with them as mentioned above.

Tells Story of the Growth of Meyer Furnace Company.

The Meyer Furnace Company is an outgrowth of a small hardware store started in 1866 by Frank Meyer on South Adams Street, Peoria, Illinois.

In 1872, the firm name was changed to "F. Meyer & Brother" and in 1892 was made "F. Meyer & Brother Company."

The little hardware store and tin shop had grown rapidly and the firm was by this time dealing in many lines kindred to the general line of "hardware," including furnaces.

In the installation of warm air furnaces the Company discovered the strong points and the weaknesses of several makes and in 1894 the ownership of what is now widely known as the Weir furnace was acquired and the Meyer Furnace Company was formed as a separate corporation owned and managed by practically the same officers as the F. Meyer & Brother Company.

Improvements and changes were made from time to time in the Weir furnace, but the original principle of construction was never altered.

The business has grown mightily. Additional manufacturing facilities and space have been required from time to time, and the capital stock has been increased as well.

A big new foundry has just been completed across the river in East Peoria and the Meyer Furnace Company owns a valuable acreage adjacent thereto.

THE OUTGROWTH, *to date*, OF FRANK MEYER'S LITTLE TIN SHOP IN PEORIA



RETAIL STORE & OFFICE
F. MEYER & BRO. CO.



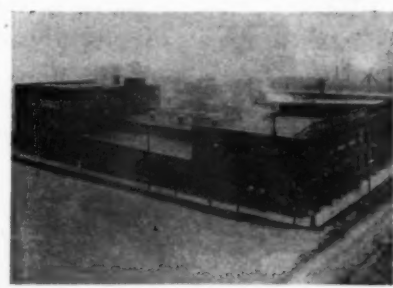
Frank Meyer
FOUNDER DIED JUNE 17, 1911.



HANDY PIPE FACTORY
F. MEYER & BRO. CO.



SHEET METAL & ROOFING DEPT.



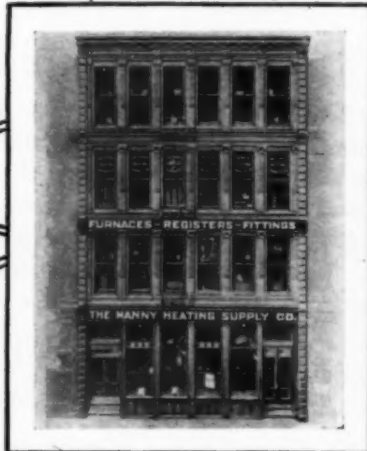
FACTORY OF MEYER FURNACE CO.
(WEIR FURNACES)



NEW FOUNDRY BUILDING
THOROUGHLY MODERN



NORTHWESTERN FURNACE & SUPPLY CO.
• MINNEAPOLIS •



MANNY HEATING & SUPPLY CO.
• CHICAGO •



DUNNING HEATING SUPPLY CO.
MILWAUKEE



NEW BUILDING OF ROCK ISLAND
REGISTER CO. ROCK ISLAND.



STANDARD FURNACE & SUPPLY CO.
• OMAHA •



MEYER FURNACE & SUPPLY CO.
KANSAS CITY

The next change or move will be to this new location, and prospects are that this will be necessary very soon. Distributing houses are now maintained at Pittsburgh, Omaha and Kansas City.

Today there are more than 50,000 Weir furnaces in use.

Production of the Weir has gone up with leaps and bounds in the last few years—and especially last year.

Made throughout of low-carbon boiler plate with almost all of the joints now being acetylene or electrically welded so as to make the whole furnace practically one piece of metal, it is now looked upon by the manufacturers with greater pride than ever.

With the Weir combustion principles of actually burning the gas and soot (as seen through the fire door window) and the extra-heat drum at the rear, the Weir manufacturers are positive that they offer the utmost in warm air furnace value and efficiency.

The Weir is not a "price" furnace: it is built for the man who knows and appreciates that "the best is the cheapest"—the man who knows that an article that costs more to get generally costs less to keep.

At the present time Dirk Meyer is President, George Meyer, Vice President, and George Harms, Secretary-Treasurer. R. C. Walker is General Manager and in the past year he has been instrumental in helping toward a handsome increase in production and sales. In fact, "All's well" with the Meyer Furnace Company and they look forward to 1921 with a great degree of anticipation.

A Furnace Company that Practices an Ideal.

An organization more than one hundred years old—and still young—that is the unique record The Monitor



S. C. Bernhardt, Vice-president and Sales Manager The Monitor Stove Company, Cincinnati, Ohio.

Stove Company, Cincinnati, Ohio, manufacturers of the CaloriC Pipeless Furnace.

The Monitor Stove Company, known nationally as "The Monitor Family," was organized in 1819 for the manufacture of stoves and ranges by William Resor & Son, contemporaries of the famous Benjamin Franklin who was the inventor of the heating stove.

During more than a century of vigorous business life The Monitor Stove Company has manufactured first stoves, then pipe furnaces, and finally the CaloriC

Pipeless Furnace. They are the pioneers of pipeless heating.

The CaloriC Pipeless Furnace from its inception proved to be such a success that for a number of years The Monitor factory has concentrated on the manufacture of this one product exclusively, although there are still thousands of the famous Monitor stoves and ranges in use throughout the land.

Its triple casing construction permits of an insulating air channel which acts as a positive division between the bodies of warm and return air.

This special construction prevents the radiation of heat to the outside casing.

The patented CaloriC division plate makes possible the straight flush front construction that insures a cool cellar.

The heavy, double-ribbed one piece fire pot is made of pure pig iron—no scrap—and is guaranteed for five years against cracking or breaking.

Besides these desirable features may be mentioned, among others, the large feed door which will admit chunks of wood, coal, or any other furnace fuel; the copper-oxidized, lacquered register that will support a weight of at least 1,500 pounds; the two-gallon water pan, properly placed so that the heated castings evaporate the water rapidly; the absence of angles in the casings which reduces friction and prevents the pocketing of air; and finally, the accurate workmanship which insures perfect fitting of all parts when the CaloriC is set up.

The CaloriC Pipeless Furnace is guaranteed to warm any building in which its installation is recommended, to 70 degrees in coldest weather or the purchaser's money refunded.

The Monitor Family policy is one wherein the individual worker is given a large amount of responsibility, and has the opportunity to develop his ability to the fullest extent.

The result of this plan of conducting the business is unequalled cooperation and service.

Growing out of this policy, a slogan has been crystallized by the trade. It is: "The Monitor Family—Good People to Work With."

Asbestos Company Moves Into New Factory and Warehouse.

Asbestos Products Company with offices in the Consumers' Building, 220 South State Street, Chicago, Illinois, have moved into their new factory and warehouse at 1680-1682 Wright Street, Chicago, Illinois.

They are carrying a large stock of Asbestos Paper, Rollboard, Millboard, Corrugated Asbestos Paper, Cement, etc.

They are manufacturing Asbestos Cement at their new Chicago plant, having installed the most modern equipment for the manufacturing of this product and are using a special long Asbestos Fibre making the Asbestos Cement of the very highest quality.

The president of the company is F. C. LeRow, formerly of the Philip Carey Company of Cincinnati, Ohio.

His many years' experience in the asbestos business is responsible for the rapid growth of this company.

Mr. LeRow insists that "Quality" and "Service" be the slogan of the organization.

What the Customer Wants to Know Is How to Get the Greatest Amount of Heat with the Least Coal and Labor.

The Success of the Manufacturer Depends on How Good a Salesman the Dealer Is, and the Dealer's Success, Also.

Written especially for AMERICAN ARTISAN AND HARDWARE RECORD by J. C. Greenberg, Peoria, Illinois.

(Copyright, 1920, by J. C. Greenberg.)

Much has been said and written concerning Warm Air Heating. While I am almost entirely ignorant of the technicalities which enter into a warm air heater, I am fully awake to the fact that a warm air heater is made to serve, and to sell.

There are three important human elements which enter into the life and success of any kind of warm air heater, and these elements are, 1st, The Manufacturer; 2nd, The Dealer, and 3rd, The Customer.

Let us take this matter up from this human element of viewpoint, and see what can be done to make warm air heater selling a real and prosperous profit producing business.

Too much has been said and printed regarding the construction, and material which enter into a warm air heater.

The manufacturer of any kind of heater claims that his is the best. The dealer takes this up and also claims that his heater is the best.

It seems that it is against the law of natural value to assume or infer that all heaters are the best.

There may be many good heaters, but it is impossible to have each one be the best. In accordance with all the rules of logic, that this is impossible.

Let us see if we can, what can be done to make them all serviceable and profit producing, both to the dealer and the customer, who is the ultimate user.

The Manufacturer.

I have heard dozens of furnace salesmen sell furnaces to dealers. I am not afraid to state, that 90 per cent of these sales efforts were centered on the material, construction, and heat producing power. Of course this is all very good. The salesman for any furnace manufacturer is paid for this very thing. His mission is to be such a good "explainer" that the dealer will decide to handle his make of furnace.

The same manufacturer has an advertising department which devotes its brain effort in laying out advertising matter which embraces a great many thousands of good dollars telling the dealer how good and profitable their furnace really is.

To my knowledge, I do not know of any manufacturer who takes any time, or uses any energy to teach the dealer the selling art necessary to his success.

The manufacturer takes it for granted that his dealer knows how to sell, and in the event that he does not know, it is his own hard luck.

Certainly, the manufacturer knows that the better a salesman his dealer is, the more furnaces he can sell, and the more he sells, the busier will be the manufacturer.

The manufacturer seems to lose sight of this fact. He seems to forget that the dealer must be able to back up the advertising matter which cost so many thousands of dollars.

Unless the dealer can explain his furnace to the customer and be able to interpret the advertising matter, he stops the progress of the manufacturer.

Advertising matter which deals with "friction of air" and with "B. T. Us." and "cross sections of 10 inch pipe" is all Greek to the men who want a furnace installed.

No man can conceive that which he knows nothing about. The customer has a perfect right to say to the dealer:

"Tell it to me my way. Give it to me from my point of experience so that I can imagine it. Till then, you have no right to ask me to buy your furnace."

Does the manufacturer teach the dealer how to interpret all this?

I guess not.

It is not really a matter of steel versus cast iron, or of deep or shallow fire boxes, or of short or long ash pits that the customer is interested in.

All the customer wants to know is, can he get the greatest amount of heat with the least amount of coal and use the minimum effort to get the desired result.

Technicalities do not answer this to the customer.

The manufacturer must put up an educational bureau where the dealer can learn analysis, synthesis, and comparison between his own furnace, and competitive furnaces.

The day is gone when big adjectives sell goods.

Superlatives breed distrust.

As Mr. Greenberg so aptly puts the matter, it is against the law of natural value to assume or infer that all heaters are the best.

All heaters, however, can be made to serve the interest of maker, dealer and customer.

Of course, the real object of the warm air heater is to render the home cozy in cold weather.

Hence, all advertising and direct salesmanship must have that fact as the central motive.

Profit will come logically as the outcome of the right kind of system in making, selling and installing the warm air heater.

He must know other furnaces as well as his own in order to sell right.

The manufacturer must go farther than this. He must bring this knowledge to the dealer's door.

He must exchange ideas with the dealer, and get on a better basis of understanding.

Is it not a fact that the manufacturer sends salesmen on the road who knows the business?

Is it not also a fact that the dealer is a salesman as well as the traveling man is?

Is it not a fact that if the dealer is a poor salesman, that the traveling man can not sell him, and when he can not sell him, the manufacturer can not make?

This is what I mean when I say that the manufacturer must make a salesman of his dealer. There is no other way.

The success of the manufacturer depends on how good a salesman the dealer is.

The answer is, district conventions, personal contact, lectures in selling, actual selling demonstrations often and many.

The money lost in wasted and unread advertising will pay for this. The manufacturer should not pay so much attention to Dun and Bradstreet, and put Mr. Webster's Dictionary into actual use, because if the dealer becomes a better salesman, he sells more furnaces, and Mr. Dun and Bradstreet will give him a better rating. This is too obvious to dwell any farther on it.

The Dealer.

From the factory the furnace goes to the dealer. The dealer as a rule is a good mechanic of ability. He is a thorough and logical man as an artisan—but generally is not a trained salesman.

He works all day at his trade, and has no time to put in on selling education.

The knowledge he gets about the furnace he sells is obtained from experience only.

While experience is the best teacher, it is also the slowest teacher. By the time the dealer becomes a good salesman, he is ready to retire from business.

The dealer has not only his furnace problems to solve, but he has his other problems which arise from other work than that of furnaces.

One good lecture in scientific salesmanship will save him a year of experience. One actual demonstration brought to his door will give him more experience than ten installations.

The dealer is a business man, and is willing to learn facts providing these facts are stripped of the usual hot air which the salesman includes in his talk.

I am a salesman myself, and I know what I am talking about. A salesman should be a friend and a teacher as well as a seller for his concern.

The trouble is that many manufacturers allow their salesmen to work by the railroad time table instead of by the benefit due to the dealer.

True is it, indeed, that a salesman must make his territory. If he does not, his competitor will.

This is why a manufacturer must use other educators instead of salesmen.

Is not the dealer entitled to educational service from the manufacturer who takes his money for goods?

If the dealer were as good a salesman, as he is an installer he would be a real artist in his business.

An artist is he who applies skillfully the facts of his business. He should get facts, installing facts—and selling facts.

This will make him an able man in his line, and he can demand that laws be enacted to protect his craft.

He could have actual laws passed which would compel every man who sells furnaces to be an artist. This would protect the public from faulty installation, and faulty selling.

Here is how this will work out:

The customer has a right to life, liberty and pursuit of happiness. Our Constitution gives him this right. Now then, if a faulty installation interferes with his right to the pursuit of happiness the sale is interfering with his rights as a citizen.

I am serious about this. There should be laws specifically for this.

If the dealer gets the proper knowledge in installation, and selling, he becomes an artist, and the public will not be robbed of their rights.

It is up to the manufacturer to furnish this education, and when this education is applied by some and misapplied by others, there will be a contrast between good and bad.

If it is good, it is beneficial. If it is bad there should be a law against it.

Education makes the piker into a useful dealer. If the dealer does not see fit to learn, he will soon drop from the list of dealers, because the law will not allow him to continue.

I mean by this, that when laws are put into use demanding that a dealer be able to install properly, and scientifically, he will have a license which will allow him to serve the public beneficially.

If he does not want to learn, the law will say, "You are incompetent," and he gets no license.

No license no work. Yes. This will all come to pass because the public is concerned, and the public is the law.

The dealer wants to learn more, the manufacturer wants him to know more, and they must get together sooner or later.

The sooner the better.

It is a law of nature that "He who serves best profits most." The dealer knows this, and so does the manufacturer. Just watch them and see what will happen.

The Customer.

The customer is the most important element in any business.

The furnace business is no exception to this rule.

Without the customer, neither manufacturer nor dealer could possibly exist. It is a deplorable fact that the customer is often the victim of misinformation, misselling, and misinstallation.

Why is this? The most necessary element in the furnace business is so often misused.

The dealer does not wilfully misrepresent. The answer to this is, that he is a victim of ignorance on the part of the dealer. (Not all dealers are ignorant. I am talking here to the dealer who is not an artist in his business.)

The customer's judgment to buy is governed by the number of facts the dealer has.

If the manufacturer does not supply the dealer with the facts, the customer suffers. The customer talks price as soon as the dealer who is supposed to be a salesman runs out of facts.

No furnace is worth more than the facts presented.

Do you get this?

If the dealer has many facts, he can put up a splendid sales talk which is worth real money. The customer buys a furnace on some dealer's say so.

How can he do otherwise? It is the dealer who is responsible to the customer, and the manufacturer is responsible to the dealer.

In order that the customer may get the best service and the highest degree of service, the dealer must be supplied with enough facts by the manufacturer to enable him to sell right.

The customer may not know about furnaces, but he does know what to expect of a furnace.

Here is where the rub is. He knows what he expects to get for his money, and insists on it. When he gets what he expects he is entitled to, he gets his worth of the price he pays.

Mr. Manufacturer, Mr. Dealer, get together on a better basis of understanding. Work for a good cause. Serve well, and profit most.

Learn more, and earn more. Remember that the customers are your bread and butter. More power to all three factors—the manufacturer, the dealer, and the customer.

Three Practical Men Founded American Furnace Company.

By Harry V. Bayse, President, American Furnace Company, St. Louis, Missouri.

Twenty-one years ago Harry V. Bayse, W. D. Harrison and J. H. Laux left a certain furnace concern and organized the American furnace Company.

We had had about ten years' connection with the former concern, manufacturing and installing furnaces as well as furnace repairing.

We can say truthfully that the repairing of furnaces is where we gathered the most of our ideas as to what requirements were necessary to make the best possible furnace.

We discovered the weak parts of all classes of furnaces, and made a study of the cause of the many weak parts.

The result of three practical men closely investigating the causes of the many weaknesses in many different furnaces enabled us to have a fairly good idea of the requirements to make a dependable furnace.

We discovered that cast iron fire-pots would crack and we concluded that the joints between them appeared to be much like a crack and that a new section to replace a cracked part would rarely fit the old sections.

Also, we discovered that light sheet steel would rust out, would buckle and pull away, that the public bitterly opposed a gas leaking furnace, dirty wall paper and parched air.

We considered from all angles, as we had also installed steam and hot water heating at the old concern.

We concluded that warm air heating was the most sanitary system, provided it was not burnt air and as clean as the outside atmosphere.

Hence we settled on a heavy steel furnace to be



Harry V. Bayse, President, American Furnace Company.

clean and free from cracks, with a fire brick lined fire pot to prevent burnt air.

These points well considered entered into the birth of the American Boiler Plate Furnaces which is our principal business at this time.

We have since added a line of cast iron furnaces for the novices, a line of pipeless furnaces for the stove man and a line of room heaters for the country schools.

Householders Should Be Taught to Keep Water Pan Filled.

Householders need instruction on the importance of humidity. As a matter of fuel economy and of health it is urgent that householders be thoroughly informed regarding the importance of relative humidity and attention to the humidifying apparatus or pan of the warm air heater.

That this phase of warm air heating is not as well understood by the user of the furnace as it should be is proved by the reports of inspectors.

Thus, for example, Rogers Keith, of Des Moines, Iowa, writes: "Our service men get into 3,000 Des Moines basements per year. We furnish a three gallon water pan with each furnace which, as you know, is large. Less than one-third of these are reported by our service men as having water in them at all."

"Humidity is not sufficiently appreciated by dealers generally. It is of the highest importance from a sanitary point of view and conducive to fuel economy," writes G. A. Wells, of Wells Furnace & Supply Company, St. Louis, Missouri.

How High Ideals Helped Develop Modern Way Furnace Company.

By H. W. Sigrist, Advertising Manager
Modern Furnace Company, Fort Wayne,
Indiana.

No matter how cynical or disillusioned a man may be, he can not live and work without some ideals.



H. W. Sigrist, Advertising Manager Modern Way Furnace Company, Fort Wayne, Indiana.

He may not always recognize the ideals as ideals but they are as essential to him as the oxygen which he breathes out of the air.

It is the fashion in some circles to sneer at ideals. Sneering proves nothing. It disproves nothing. Merely, it is a waste of muscular effort. The most it can do is to make wrinkles around the nose.

We of the Modern Way Furnace Company are proud of our ideals. Indeed, our entire organization is the outgrowth of an ideal.

The beginnings of that ideal were simple. Prior to 1912, A. E. Rose was traveling over the Central West selling furnaces for one of the leading furnace manufacturers of the East.

His observations convinced him of the advantage of building a warm air heater along lines of simple and substantial construction which would combine quality and service.

With that ideal in mind, he organized the Modern Way Furnace Company in 1913.

The ideal was held aloft and clear in spite of the discouragements of labor shortage and poor shipping facilities during the war days.

Indeed, out of those difficulties grew new ideas of improvement.

The coal shortage and consequent high prices actuated the Modern Way Furnace Company to study the problem of producing a heater that would save fuel, a heater that would burn low grades of coal with greater success.

Always in the minds of the Modern Way Furnace Company and the men who constitute its personnel was the vision of a factory where every molder poured enthusiasm and desire for the best furnace into each mold, where every grinder and moulder might see the finished product as a perfect product.

The vision is developing into actuality. Its inspiration has already spurred the men behind the Modern Way Furnace Company to build a completely equipped, up-to-the-minute factory and to produce the wonderful 1921 Modern Way Furnace.

There is a spirit of sustained enthusiasm throughout the Modern Way Furnace Company organization. The mechanics, the office employees, and the selling force are brought under the sway of the vision and the ideal.

They are convinced that they are making, distributing, and selling warm air furnaces scientifically designed—furnaces that give comfort and promote economy.

The vision is becoming the reality, and it continues to give motive for other visions of greater achievements in the years to come.

Designs New Furnace Suitable for Present Day Fuel.

New Black Diamond, all cast furnace, recently introduced by The Black Diamond Furnace Company of Monmouth, Illinois, is especially suitable for present day fuel. It is manufactured for both Pipe and Pipeless installations.

While closely adhering to the design of their well known Maple City Furnace, it has embodied in its construction many distinctive features adapted to the present day quality of fuel.

The new Furnace has square cornered ash pit construction, affording more accessibility.

It is unusually wide with deep receding base to receive a large quantity of water, which is strongly recommended by the manufacturers, claiming the steam generated by hot coals dropping from the grates in the water, is important aid to combustion where dirty coal is used; also, the ashes are free from dust and not disagreeable to remove.

The grates are of the patented Cutter Bar type, recently brought out by the manufacturers for the Black Diamond. They are triangular in design, with the shaker bars on the outside, to prevent skinning knuckles when removing ashes.

The grates are mounted in a frame and suspended below the fire pot in such a manner to make them easily removable.

In addition, it is claimed the large space provided between the bottom of the pot and top of grates will prevent ash accumulation at this point, giving abundant air supply to the fuel.

The water pan or humidifier is unusually large, holding five gallons, and the cover is hinged on front so as to dump all accumulations on the floor.

Two-piece fire pots are used with unusually large grate area. Both the top and bottom pots have uniform walls, while the bottom pot is provided with a self cleaning air flue.

The double feed door measures 13x14 inches. The combustion chamber is unusually heavy and strong. It is constructed with a maximum load of four pounds per square inch cross section at the top, point of greatest strain.

The radiator is designed to provide unusually large heating surface and has a shape that retards the flow of gases in their travel to the chimney. A damper is also provided.

Double seated joints are used throughout, whereby the fiber asbestos cement is fully enclosed in cast iron, assuring permanently gas tight construction.

Practices Policy of Fair Treatment to All.

The stove and furnace trade needs no introduction to the Fanner Manufacturing Company of Cleveland, Ohio.

Its standard for quality and promptness in execution of orders and general fair treatment of the trade have



John Raible, President The Fanner Manufacturing Company, Cleveland, Ohio.

placed it in its present enviable position and is known to all.

We are pleased, in this issue, to present the picture of the gentleman at the head of the institution, the one who is responsible for this policy, and who insists that the first consideration of his assistants is to take care of the trade—and that is why such a spirit of friendliness has grown up between the trade and this Company.

It is better equipped than ever to continue to serve you promptly, efficiently and at as low prices as are consistent with good workmanship and quality.

Uses a System of Straight Line Production.

By C. C. Sinclair, Secretary and Sales Manager Premier Warm Air Heater Company

The Premier Warm Air Heater Company, Dowagiac, Michigan, is now occupying its new plant.

The Company was only organized March 18th of this year, and started construction April 19th. They purchased a six acre tract on the main line of the Michigan Central.

The new buildings are of the latest architecture, designed for an annual capacity of 6,000 furnaces, with a low overhead expense.

If you were to step into their plant today, you would see what authorities claim is one of the best planned furnace plants for economical production anywhere.

"As the crow flies" is the shortest distance between two points, is the way the parts go through this model

plant. Pig iron enters at one end, by the time it reaches the other end, it is in the finished product.

Planned on the "straight line" manufacturing idea, it is the straightest line from the rough to the finished product that is possible in the manufacture of warm air heaters.

In this efficient shop, workmen do not crowd and run into each other; interference is impossible, for the product passes from one department to the next until it reaches the shipping room.

This straight line production, coupled with the one floor plan of factory buildings, saw tooth roofed, with plenty of light and ventilation, cuts production costs to the bone.

Labor-saving machinery is installed wherever possible. The factory is a complete unit built in accordance with the times and will be able to produce warm air heaters more cheaply than hitherto, due to its modern and progressive facilities.

The growth of the warm air heater industry is reflected in this organization of the new Company to keep pace with the growing demand for warm air heaters.

The plant is equipped with the latest Whiting Cupola. And the new Premier method of melting and pouring the iron purifies it and eliminates all impurities from the furnace castings.

In the cleaning rooms there are installed batteries of Whiting Mills, set in heavy concrete foundations, because of the great vibration that results when they are put in operation.



Harry L. Wood, Vice-president and General Manager Premier Warm Air Heater Company, Dowagiac, Michigan.

The castings are then passed on through the Mounting and Fitting room to the Sheet Metal department, until they reach the shipping room, crated and ready for shipment.

Just outside the shipping room door are the waiting freight cars ready to take Premiers to you, no matter where you may be in the United States or Canada.

The plant is equipped with Air Compressors of the latest designs.

The Company operates its own power plant, which consists of two units of Fairbanks-Morse Semi-Diesel Engines, burning fuel oil.

The Premier will manufacture a complete line of pipe and pipeless heaters. They possess many new features of practical value, which will appeal to the wide awake dealer.

The men behind the Premier face heating problems with open minds. They have not made radical changes in design or novelty or advertising effect, and have designed a heater that will burn the present low grade of fuel with economy and deliver a satisfactory amount of warm air.

A large percentage of the men who make the Premier are participating stockholders of the Company. They invest their lives where they invest their money and are proud of their product. Every moulder and mechanic in the Premier plant knows he is building an honest furnace.

The pipe heater can be converted into a pipeless without the usual extra extension front and casing rings. The smoke collar and the clean-out are cast on and extended through the casing in both pipe and pipeless.

Premier radiators are reversible, so that the smoke pipe may have a straight run to the flue and yet have the furnace face in any desired direction.

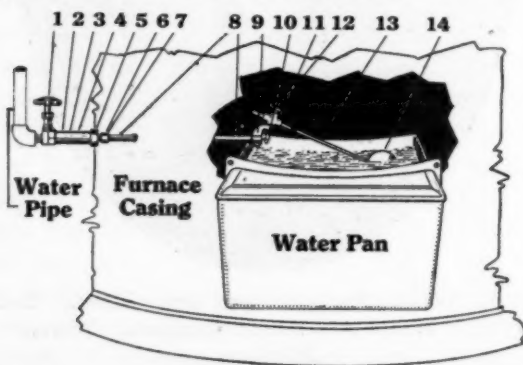
Officers of the Company are: William F. Judd, President; Harry L. Wood Vice-president and General Manager; C. C. Sinclair, Secretary and Sales Manager; Richard M. Judd, Treasurer; and Ralph S. McNaney, Superintendent.

Full particulars and details of proposition to dealers can be had by writing to the Premier Warm Air Heater Company, Dowagiac, Michigan.

Promotes Health and Keeps Complexion Fresh and Rosy.

Life without health is hardly worth living.

Here and there there may be heroic souls who contrive to get a measure of happiness out of existence in spite of more or less chronic illness.



The Humidicon, Made by Riekse Manufacturing Company, Grand Rapids, Michigan.

But most of us do not enjoy the good things of this world without bodily vigor.

There are lots of people who are in the pink of condition during mild weather but who dread the approach of winter because it means a series of colds.

As in many other affairs, prevention is better than remedy.

One of the easiest and surest ways to keep health during winter is to maintain the right percentage of relative humidity in the home.

Dry air irritates the delicate membranes of the breathing passages, namely, nose, throat, and bronchial tubes. Therefore, any device which insures a continuous supply of the right amount of moisture in the atmosphere of the home is a benefit to humanity.

It is strictly along these lines that the Humidicon, made by the Riekse Manufacturing Company, 31 Ottawa Street, Grand Rapids, Michigan, is a distinct advantage to the warm air heating industry and to the households equipped with warm air heaters.

An additional selling argument in favor of this useful and almost indispensable mechanism is that it not only promotes health but aids in keeping the complexion fresh and rosy.

The outer layers of the skin are very sensitive to the variations of air condition. Dry air has a bad effect on the outer membranes of the skin whereas moist air keeps them in excellent state.

The Humidicon, shown in the accompanying illustration, is very simple in operation. It is trouble proof. Being made of brass and copper, it should last indefinitely.

Besides, it is a great service in maintaining the health of the people of the household, it also protects the house itself and furniture. In a properly moistened air, woodwork will not dry out and pull apart at the corner joints. Plastered and papered walls will not crack nor floor boards dry out so that large cracks open up between them.

Moreover, the piano will be kept in much better condition and will hold its tone remarkably well and seldom need retuning.

Inasmuch as the dealer and installer of warm air heaters prospers in the ratio in which he is able to render service to his customers, the Humidicon should prove of immense assistance to him in the work of intensifying the goodwill of his patrons.

Opinions Differ on Licensing Furnace Installers.

There is a great diversity of opinion regarding state laws controlling the installation of warm air heaters.

Trained furnace dealers and installers agree that some sort of measure is necessary to exclude unskilled people who make warm air heaters merely a side line to some other business.

How such measures should be drawn up and to what extent they should be embodied in state or local laws seems to be difficult to determine.

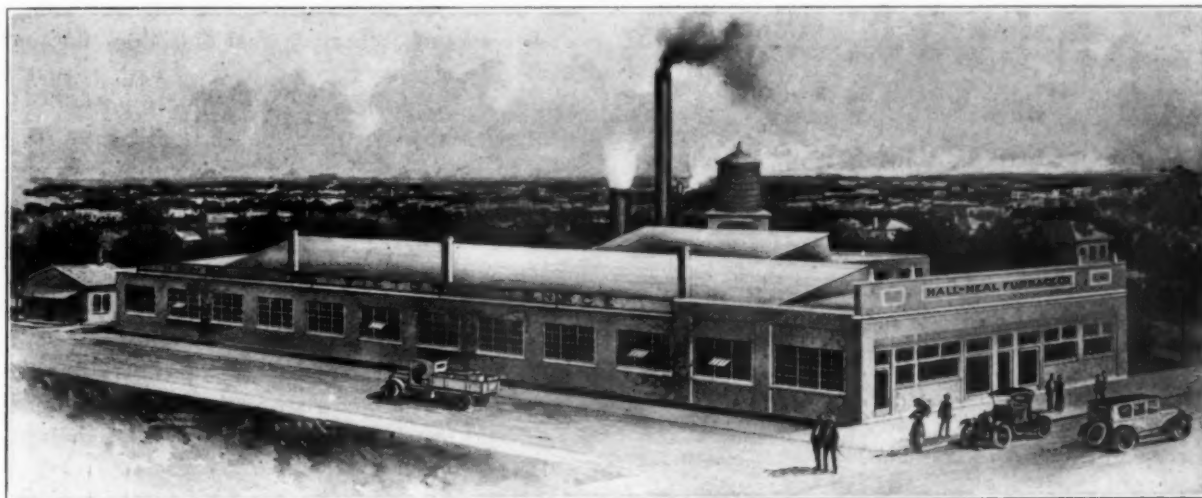
A prominent southern installer is opposed to state laws controlling installation if such laws are "drawn up by unexperienced University students and politicians as some are."

C. R. Oberholtzer, Angola, Indiana, thinks that installers should be licensed by the state, but that the examination should be taken like Civil Service examinations in order to preclude the possibility of political interference and to insure the honesty of the results.

Hall-Neal Furnace Company Now Located in Finely Equipped Factory.

For the past two months, the Hall-Neal Furnace Company have enjoyed making their Victor steel warm air heaters in a brand new factory, equipped with the most modern machinery and pleasantly situated at 1322 to 1326 North Capitol Avenue, Indianapolis, Indiana.

As will be noted from the accompanying illustration, the factory has light on all four sides and the two long saw-tooth skylights make it possible to operate without artificial lighting on any but the most gloomy days.



New Plant of the Hall-Neal Furnace Company, 1322 to 1326 North Capitol Avenue, Indianapolis, Indiana.

Among the new machines which they have installed is an "Eveready" welding outfit with which all seams on their warm air heaters are joined in a most thorough manner.

The Hall-Neal Furnace Company maintain an engineering department through which they are prepared to furnish their local dealers with blue prints and complete plans for installation of warm air heating apparatus, thereby materially assisting in the work of bringing installation work up to a highly efficient standard, realizing that every well installed warm air heater will help the sale of more.

The Taplin Furnace Company Has Cooperative Policy.

The dealer is not merely a servant of the manufacturer. He is and should be the friend, agent, and ally of the producer.

Having mutual interest, in theory at least, dealer and producer prosper above the average run according to the degree in which they put their interlocking interest into practical value.

There is no reason why the relations between manufacturer and dealer should begin and end with the sale of a stock of warm air heaters and the final payment of the bills in connection therewith.

It is because of these considerations that the Taplin Furnace Company, Grand Rapids, Michigan, has established a cooperative policy in virtue of which every dealer handling the line is given an interest in the company.

The Taplin hot blast furnaces are designed and built to satisfy the most critical and exacting of deal-

ers. That is to say, these furnaces embody the best selling features and are so constructed as to minimize the dealer's labor expense in casing and mounting.

Furthermore, by devising these Taplin furnaces in such a manner as to meet conditions existing in the fuel industry everywhere, the manufacturers are able to give customers thorough satisfaction. The Taplin furnaces burn any grade of bituminous coal as well as hard coal or coke.

The hot blast feature of the Taplin furnaces is the result of much planning and experiment.

As the same condition existing in the firepot when

the new fire is burning can not exist very long after the ashes begin to form on the grates, the hot blast features are designed so as to be timed by the rate of combustion, be it night or day, and to insure the proper amount of air delivered at the surface of the fire and at a temperature equal to the gas within the firepot.

Leading authorities agree that there is but one point at which the carbon monoxide gas can be transformed into carbon dioxide gas and that is directly at the surface of the fire.

The Taplin Hot Blast Furnaces are designed and built to give long service with a minimum of fuel consumption, as well as to minimize the cost of production without lowering the quality of the product.

All excess parts have been eliminated, there being but thirty pieces of castings to make up the entire heater, whereas from fifty to seventy-five pieces of castings is not unusual in heaters of this type.

The entire line of Taplin Hot Blast Heaters consists of five sizes of pipe furnaces, ranging from 18 inch pots to 32 inch pots inclusive, these same sizes also being made up into what is called the Triplex Heater, this type being designed to warm satisfactorily such houses where a pipe heater can not be installed and a one-pipe heater is impractical.

Then the Company will manufacture three sizes of one-pipe heaters, ranging from 18 inch to 24 inch pots inclusive. This gives a very flexible line of heaters, covering practically every condition coming within the limits of the warm air furnace.

Another feature embodied in the Taplin Hot Blast Furnaces which perhaps no other line possesses, is the scale on which they are built. The No. 46 Heater, with a 24 inch fire pot and 22 inch grate was designed

along lines which the Company believed to be the best proportions for a warm air furnace.

All of the other sizes are built in exact proportion to this unit, the 21 inch firepot size with a 42 inch casing being 21/24ths of the No. 46, and the 27 inch firepot size being 27/24ths of the size of the No. 46, these measurements being constant in everything but the doors.

The personnel of the Taplin Furnace Company consist of men very well known in the furnace industry—men having a broad experience in designing and manufacturing of warm air heaters and in marketing them.

During the long period in which most of the officers have been connected with the industry, they have encountered and overcome formidable obstacles of manufacturing and marketing. Their experience is passed on for the benefit of dealers handling the Taplin hot blast furnaces.

Neal W. Taplin is president of the Taplin Furnace Company. He has a successful record in the business and the reputation for fair and square dealing with all who have met him.

The secretary of the Taplin Furnace Company is Charles E. Miller, who is also president of the Miller Furnace Company, Grand Rapids, Michigan. He has had forty-three years' experience in the warm air heater trade.

Forris D. Stevens, Treasurer of the Taplin Furnace Company, is also Vice-President of Foster-Stevens and Company, wholesale hardware dealers of Grand Rapids, Michigan, and enjoys a splendid reputation among furnace men and hardware dealers.

Prospects for Warm Air Heater Trade Are Encouraging.

By Allen W. Williams, Secretary National Warm Air Heating and Ventilation Association.

The prospects for 1921 in our industry are not so easy to judge as one might suppose and still it does not

require much of an optimist to feel that if there is even a slight increase in home building the demand for warm air heaters will be good.

Notwithstanding the fact that the construction of new homes was smaller during 1920 than for many years, the trade has been remarkably satisfactory.

The furnace industry is passing through the readjustment period without serious misfortune, and while no boom is expected during the early months of the new year, no one has the least fear that trade will be much, if any, below normal.

As to prices, the manufacturers and dealers gener-

ally seem to understand that there will be no radical reductions in furnaces as the margin of profit to either has never been more than a staple one.

One gratifying condition which existed during 1920 and promises to continue, is the fact that the increase in popularity and use of warm air heating is not confined to any particular part of the country.

Circumstances have been favorable to the sale of the pipeless heater as an unusually large proportion of installations have been in dwellings or small buildings already erected.

While it is a popular heater, I am satisfied when a thoughtful analysis is made of the subject a conclusion will be reached indicating that this does not mean a decline in the use of piped jobs. Further, that while the sale of the pipeless will continue to grow the building of even some of the thousands of homes, that are so badly needed will create an equally heavy demand for piped warm air heaters.

The research work, in reference to warm air heating which is being carried on by the National Warm Air Heating and Ventilating Association at the University of Illinois under the direction of such well known authority as Professor Willard and his able staff has made remarkable progress during the year that has passed and promises more for the twelve months that are before us.

It has required both time and patience to make the proper preparation in instruments and to secure the necessary engineering data before the real work could start.

All of this has been accomplished and manufacturers, dealers, architects and even the general public have become interested in this activity.

Every builder of furnaces or heating engineer should visit the University of Illinois and see for himself how carefully and accurately the work is being conducted and thus appreciate the practical value of the undertaking.

Good installation always has been and always will be a most important factor when it comes to economy in fuel, real efficiency and comfort and our Association believes that its research work will assist wonderfully to that end.

While the manufacturers of Warm Air Furnaces are proud of their product as a whole, they are enthusiastically interested in making further improvements, that is real improvements, not freaks, and will continue to work to that end.

Manufacturers are insisting more and more upon proper installation of the heaters which they make and giving each installation increased personal attention through their engineers or other capable employes. This is doing much to properly post dealers, it is good business and highly gratifying to the ultimate consumer.

Unless I miss my guess 1921 will be more than a normal year in every way in our great industry.

If your relations with your competitor aren't any better than they are with your wife's relatives—that's rather too personal, isn't it?



Allen W. Williams, Secretary National Warm Air Heating and Ventilating Association.

Use of Manufacturers' Advertising Helps in Local Publicity Is a Good Way to Get Profitable Trade.

Posters, Cut-outs, Newspaper Electros, Illustrated Folders and Circulars with Dealer's Imprint Are Big Sales Factors.

Messages can be sent all over the world with wireless.

But people all over the world do not individually receive the messages.

So it is with ideas and information regarding warm air heaters. The knowledge, service, construction and comfort of warm air heaters is to be found everywhere in books, trade journals, pamphlets, circulars, etc.

But everybody does not receive the knowledge. In other words, we have not reached a stage of mental growth where ideas come to us the same as oxygen out of the atmosphere.

There are thousands of persons who go through life without ever receiving a single wireless message, although the waves of ether carrying wireless messages pass through their localities hundreds of times a day.

It is only when the message is directed to them personally and delivered to them that they become aware of its contents.

It is precisely the same with the message of the warm air heater. If you do not deliver the message directly to your prospective customers, as individuals, the chances are that it will never reach them.

This is only another way of saying that if you want to sell warm air heaters you must advertise them.

Now, from some angles, advertising is a costly thing for the dealer.

If he has to make up his own posters and circulars, pay artists for drawing pictures and engravers for making halftones and electros, it will entail an expense probably too great for his business to carry in its present state of development.

The manufacturer, however, can easily carry the burden of such a costly process because he is in a position to distribute it over a wider area of business. Hence, the proportion which each of his furnaces has to bear of the total cost is insignificant.

Consequently, it is to the interest of the dealer to make use of the advertising helps so freely offered him

by the manufacturer.

In an effort to find out to what extent the manufacturers' advertising helps are used by dealers, AMERICAN ARTISAN AND HARDWARE RECORD sent out a questionnaire to representative retailers and installers of warm air heaters in various parts of the country.

Suggestions for more profitable use of manufacturers' advertising helps are contained in the following summary of the replies received in answer to the query:

John A. Pontius, Geneva, New York, says that he does not make full use of manufacturers' advertising helps and he believes that no one else does, declaring: "What might be suitable for me might not be for you." This, however, does not imply neglect of such publicity systems because he uses the manufacturers' electros for newspaper advertising, circulars for distribution through the mail, and poster advertisements.

An excellent way to make use of manufacturers' advertising helps in the dealer's local publicity is pointed out by S. J. Beard, Republic, Ohio, who writes that he connects up his local publicity with the manufacturers' national advertising.

"I use the cuts furnished by the manufacturer in my newspaper advertisements," answers C. L. Epps, Van Wert, Ohio.

C. R. Oberholtzer, Angola, Indiana, specializes in moving picture advertising by using slides in the moving picture theatres in his trade territory.

"We have a small cut of different furnaces which we run in connection with our advertisement in the daily papers," reports the Lawrence-Henry Furnace Company, Uhrichsville, Ohio.

B. C. DeVol Hardware Company, Council Bluffs, Iowa, states: "The only manufacturers' help we have used are electrotypes, and we plan our own campaign and feel that localizing our advertisements gives them strength."

Running slides in picture shows, electros in local newspapers, and tacking signs on new buildings, are the methods of using manufacturers' advertising helps

THAT the furnace installers of this country are alert and progressive, keeping well abreast of the times, is evidenced by the large number who make use of illuminated slides in motion picture theatres.

This, of course, is in addition to their employment of the established channels of publicity through newspapers, posters and mailing lists.

Several installers have pointed out what they consider to be the need for more individualized advertising helps from the manufacturer. The installer and dealer naturally knows more about the requirements of his locality than the manufacturer, and he is, no doubt, justified in suggesting certain modifications to meet the conditions of his territory.

Inasmuch as it is the purpose of the advertising helps to quicken the sale of furnaces, there is no doubt that this phase of the matter will be taken up and satisfactorily adjusted in the natural course of business.

employed by W. W. Pascoe, Chadron, Nebraska.

A. C. Buzzard, Holly, Michigan, carries advertisements in local newspapers and also makes full use of the "movies" in adapting to his purposes the advertising helps furnished by the manufacturer.

Picture slides and newspaper advertisements are also the chief medium through which the manufacturers' advertising helps are used by W. E. Foncannon, Ashland, Kansas.

Martin Ludwig, Albany, Oregon, says that he makes full use of manufacturers' advertising helps and pays particular attention to advertising through local newspapers.

"We use manufacturers' advertising helps over our own name," says the Schneider Hardware Company, Oconto, Wisconsin. "This method we adapted as the result of past experience with some manufacturers. We make full use of the helps, but above all, we make the name of Schneider Hardware Company stand for good installation and satisfactory heating of homes."

"I use most of the manufacturers' advertising helps by mailing them to my prospects," says W. F. Kasbohm, Van Wert, Ohio.

The Davis Hardware Company, Bloomington, Indiana, does not make any use of manufacturers' advertising helps for the reason that this Company finds that its own methods of gaining customers and extending trade are sufficient.

Every piece of advertising literature including circulars, folders, pamphlets, cut-outs, and the like, is used to the best possible purpose by A. J. Bridges, Bedford, Iowa, who has built up a prosperous trade, particularly in pipeless furnaces.

"We use newspaper electros, motion picture slides, and other literature furnished by the manufacturers in our local publicity," says the Perryville Hardware Company, Perryville, Missouri.

C. H. Robinson, Springfield, Illinois, says that he makes use of manufacturers' advertising helps in his local publicity only when the manufacturers offer personal help or liberal allowance for the advertisements.

"I have a display table whereon I place my advertising literature," declares O. H. Neuenfeldt, Enderlin, North Dakota. "I always include some folder or booklet with my monthly statements."

G. L. Yapple and Son, Burlington Junction, Missouri, state that they get good results from the advertising helps and electros furnished by the manufacturers as well as the folders which they include in all letters sent out to their customers.

The Churchill Hardware Company, Galesburg, Illinois, mails out manufacturers' advertising helps in the monthly statements to its customers.

Advertising in local newspapers and using whatever helps for that purpose the manufacturers supply, is the method employed by the Roemer Hardware and Implement Company, Hartford, Wisconsin.

Using fence signs on all the roads leading to town is the chief method of employing manufacturers' advertising helps, adopted by S. J. Pelz, Clinton, Wisconsin.

Joseph Harmon, Duluth, Minnesota, believes that

the intaller is too often obliged to carry more than his share of the cost of distributing manufacturers' advertising helps. He makes good use of such helps but hints that a more equitable arrangement ought to be put into effect.

Emphasizes Need for Proper Provision for Humidifying of Air.

One of the best known "trouble men" in the Warm Air Heater field is Dewitt Van Evera, whose article in the following will prove of interest to the local installer of such apparatus.

Mr. Van Evera lays particular stress upon the proper provision being made for humidifying the heated air and also for sufficient inflow of cool air, so as to make certain that the warm air heater will function in a satisfactory manner. His article follows:

"Moisture in the air (relative humidity) is an absolute necessity with any sort of heating system. Officials of many states require it in schools and other public buildings; authorities on heating and ventilating advise it; medical authorities demand it, especially in hospitals; every home should have it; every factory and work shop should have it, to make workmen more efficient.

"Dry air makes a person uncomfortable and causes one to have a chilly feeling; relative humidity will remove the cause.

"Air at zero holds only 6 per cent moisture; this same air heated to 70 degrees, increases its capacity for holding water 16 times.

"Air at 63 degrees, with proper moisture, is more comfortable than dry air at 70 degrees and it takes 15 per cent more fuel to raise the temperature of air from 63 to 70 degrees temperature.

"According to noted authorities, and various tests that I have made, place a humidifier at the center, on top of the register (use automatic water supply if possible) where all the air that passes up on all sides of the furnace and register will become properly moistened when the air is at its hottest point and as it leaves the furnace.

"A disinfectant may be placed in the humidifier, which the air will absorb and distribute throughout the house. It is possible to use a very strong disinfectant and fumigate a house where smallpox patients have been quarantined.

"The ideal heating for a residence is with a first class warm air furnace and a humidifier that will evaporate five or more gallons of water every 24 hours in central and northern states. Keep temperature of air at 65 degrees and humidity at 55 per cent or more.

"When inside circulation is desired, it is advisable to have an 8 or 9 inch pipe for outside air for an 8-room residence, installed independently, but to operate in connection with the inside air, thereby increasing its velocity without overheating and securing a greater pressure and more frequent change of air.

"All joints in the entire installation should be as air tight as practical. Leaky joints on either a gravity or mechanical system of warm air heating affect the efficiency of same."

The Little Draft-Man Allows a Longer Night's Sleep.

To enjoy a longer night's sleep and get up in a warm house in the morning is the acme of comfort.

That is precisely what the "Little Draft-Man" furnace regulator does for the householder. This device has no electrical connections or complicated mechanism in its operation. It is set as simply as an alarm



Showing How to Operate "The Little Draft-Man."

clock and works after the manner of a self-starter on an automobile.

It controls the furnace draft and damper by means of positive chain connections direct from the control lever to the furnace.

The "Little Draft-Man" is a simple mechanical device which is mounted at elbow height on the wall in any room in the house and automatically opens the furnace at any pre-determined time.

It saves coal by providing the right amount of air

for perfect fuel combustion at all furnace heats; prevents fuel from being half burned and wasted in the ash-pit; assures complete combustion of gases and carbon particles usually lost up the chimney flue and prevents damage to furnace parts, due to over-heating, unequal expansion and burning out of the fire-pot.

Sahlin Manufacturing Company, of Grand Rapids, Michigan, manufacturers of the "Little Draft-Man" Furnace Regulator, believe that their responsibility does not end when they have sold their regulators to the dealers. Their Mr. Stalker told our representatives:



The Little Draft-Man Furnace Regulator.

"We are not as much interested in selling to the dealer as we are in showing the dealer how he can sell the 'Little Draft-Man.' We, therefore, get up this Demonstrating Board, which we are loaning to the dealer."

With this, a customer can see at a glance how simple the "Little Draft-Man" Regulator is, and how perfectly it performs its function. Dealers who have this Demonstrating outfit in their stores, have more than trebled their sales. This outfit is very attractive, interesting, and convincing. We have often wondered why other manufacturers did not use similar selling aids for their dealers.

Works for the Good of the Entire Industry.

The cooperation extended to furnace installers, architects, manufacturers of furnaces and the entire furnace heating fraternity by the Excelsior Steel Furnace Company, 114-118 South Clinton Street, Chicago, Illinois, is unusual. They extend the services of their engineering department to all who care to avail themselves of it.

They are vitally interested in every prospective job, and are continually supplying plans, lay-outs and estimates to dealers who do not handle Excelsior Furnaces.

Their suggestions and recommendations are honest and unbiased, their sole object being to secure the success of each particular installation.

The Company makes a very complete line of Warm Air Heaters. Their two new lines, the Excelsior Special and the Excelsior Efficient have been very favorably received by the trade. The oversized firepots have demonstrated their ability to economically consume all fuels.

The Excelsior Pedestal Monopipe Register made by the Company has had a very large sale and special efforts are being made greatly to increase production in this department.

The Excelsior Furnace Booster is receiving recognition from the trade and on large installations has accomplished savings in fuel, and time of increasing temperatures have been made.

The Booster increases circulation and requires no shifting of dampers. An electric connection at a con-

venient location furnishes the power. The blower and motor are outside of the casing housing, and will be supplied for any make of furnace.

A testing station is maintained in order that the results obtained with new goods may be definitely and scientifically determined. Experiments are being constantly conducted with a view to further improvement of the company's varied products.

Dependability Is Foremost Thought of Hero Furnace Company.

By George D. Carrington.

Recently I read an advertisement in one of the magazines which said: "The casque maker of olden days

always held one thought foremost in his mind—dependability. Long hours of patient toil were gladly given to insure this first essential."

Now a casque is a part of the armor the Knight wore as he rode forth to battle. It was the protection for his head. Surely dependability was essential and nothing short of the best work of the artisan was acceptable.

This item is a pertinent parallel to the foremost thought of the Hero Furnace Company in making furnaces—dependability.

If the Hero Furnace Company has done nothing brilliant, let it be content with that substantial, pegging-away process which has given the Company success. For over a quarter of a century dependability has been the "foremost thought."

The advent of the pipeless furnace and the unprecedented expansion and growth of business taxed the manufacturing capacity of the Company to its limit.

Therefore in keeping with the policy of substantial growth and dependability of service and product, the Company has now bought a new foundry at Sycamore, Illinois, has concentrated its factories and warehouses there and will immediately enter upon a new era of achievement.

All these facilities and advantages under the direct control of the Company will make surer the results of its endeavor to render service to customer and patron, and doubly insure dependability of its product.

The Hero Furnace, which has been a standard and "old reliable" for twenty-five years, will still be made.

The Hero Tubular Cast School Room Heater which

has made an enviable reputation will continue to be a "leading line."

The Hero Pipeless Furnace which at once sprang into the very forefront and first rank of "Pipeless" is to be known and used in every city, village, hamlet and country side of America.

The patterns of a new furnace are ready and soon a brand new and startling line will appear.

An office of the Company will be maintained in Chicago, but the main headquarters and offices will be moved to Sycamore with the central plant.

I think it was Emerson who first said (any way Elbert Hubbard often repeated it) that a great business or institution was often the extended shadow of one man.

In the case of the Hero Furnace Company, it may be said that the growth and success of the Company has been due to the energy and faith of one man.

In the Company's future growth and expansion that presence will undoubtedly dominate it and when the "presence" is no longer material the "shadow" will carry forth its influence.

The one man is the Company's president, John V. Patten, early of Kansas, farm reared, and corn fed.

It is safe to say that these Kansas folk are early energized in some subtle way by rays of the sunflower. The success stuff is infused into their systems.

And everybody knows that every Kansan is conscious of this, and boastful of it, and of all things Kansan.

Their noted poet Ingalls was one time visiting a friend in Delaware. As is the custom, he was boasting about the greatness of Kansas. His host, rather "fed up" on Kansas, thought he would set a little trap for the poet. Oysters are plentiful in Delaware and the host was serving the poet with oysters. He said:

"Oysters are a great brain food, Mr. Ingalls."

"They certainly are and I enjoy them," said Mr. Ingalls.

"Ah," said his host, "oysters do not grow in Kansas, I believe!"

Mr. Ingalls hesitating not a moment replied:

"No, there are no oysters in Kansas. In the all wise plan of Providence the oyster was placed where it was most needed."

All the world is glad that Providence has reared these giants out of the western plains. This source may supply the departments of industry, science, and art with the men we need.

An able staff has been secured to officer and manage the various departments of the business and loyal agents are legion.

The Hero Furnace Company is now prepared as never before to give its customers prompt service; to make its products superior in quality; and far to surpass all previous records for business getting.

The Company's aim shall be—products of the highest grade; service prompt, efficient and complete; customers satisfied; and profits fair to workers, officers, and stockholders.

Bad luck makes good luck more appreciated.



John V. Patten, President Hero Furnace Company.

Proper Installation of Warm Air Heaters Is Most Important Factor in the Promotion of the Industry.

Here Are Plans and Descriptions of Successful Installations Which Will Assist the Installer in Solving His Own Problems.

If there were no more difficulty in installing a warm air heating apparatus than there is in setting up a heating stove, many a householder would not be swearing at the installer because his house is not as comfortable as

latter organization, states that the same care and thorough consideration is given to the problems presented by their regular installer customers as were given to this case.

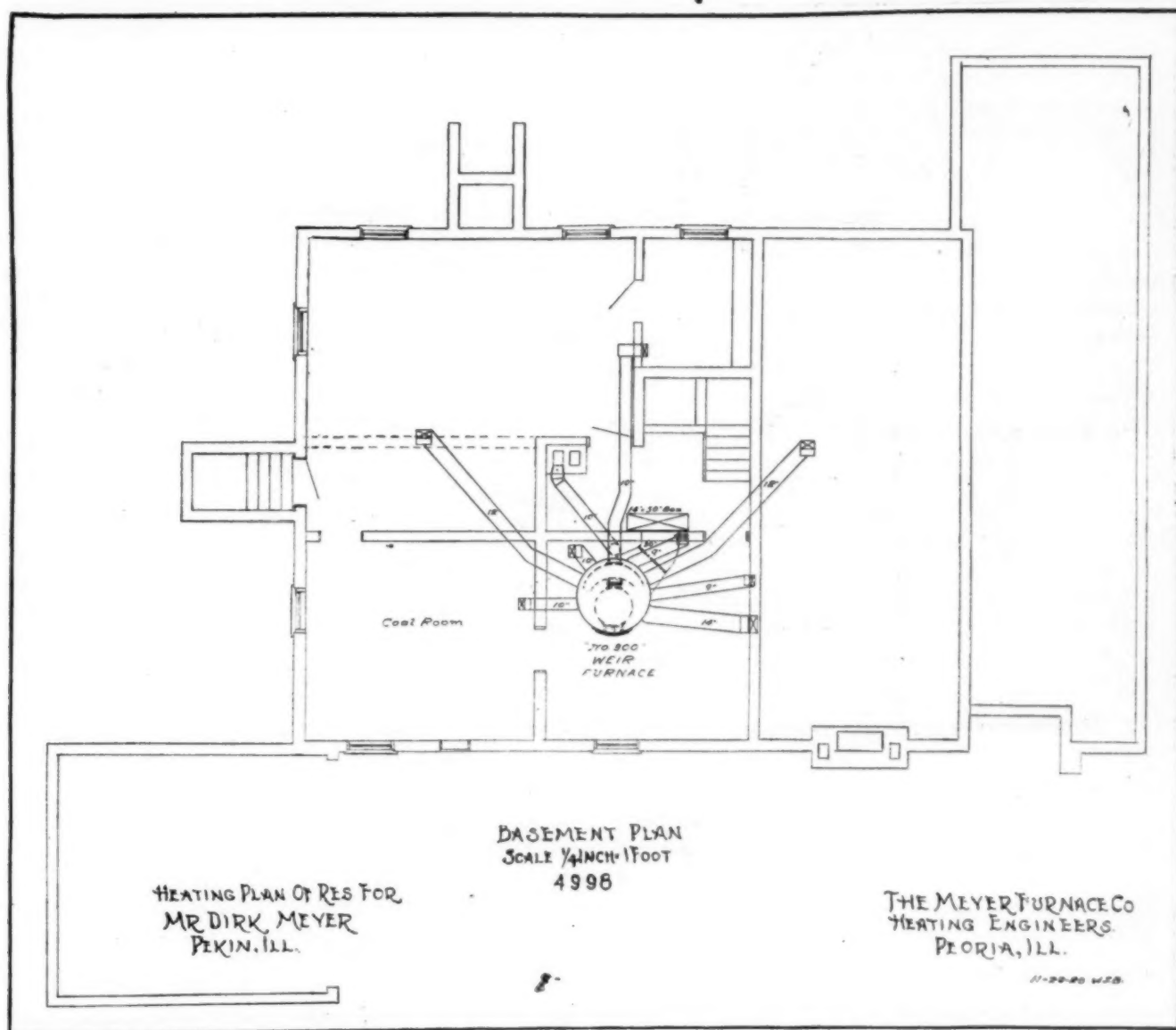


Figure 1. Basement Plan for Warm Air Heater Installation in Home of Dirk Meyer, Pekin, Illinois. Drawn by Engineering Department of Meyer Furnace Company, Peoria, Illinois.

he feels it ought to be. If every installer knew all there is to know about installation there would be little or no complaint on the part of the house owner or occupant. In the following pages we publish plans and descriptions of successful installations, the careful study of which will assist the installer in solving some of the problems with which he is often confronted.

The plans shown in the accompanying illustrations were drawn for the installation of a warm air heating apparatus in the residence of Dirk Meyer, Pekin, Illinois. Mr. Meyer is President of F. Meyer & Brother Company, and of the Meyer Furnace Company, Peoria, Illinois, but R. C. Walker, General Manager of the

Mr. Walker, in the following, describes how the plan for installation was worked out and gives reasons for placing registers and pipes as well as for the choice of sizes of these:

"The method we use in determining the size of the furnace necessary to heat a house, is first to find the size of the pipes necessary to heat the different rooms.

"In order to determine the size of pipe we must take into consideration the cubical contents of the room, the number of square feet of exposed wall surface, the amount of glass and outside door surface and the general thickness of the exposed walls.

"We first find the exposed wall surface in square

feet, deduct from this the amount of glass and outside door surface. Then we divide this sum by the thickness of the wall in inches (in no case less than ten inches), add to this the square feet of glass and outside door surface and multiply by seventy-five, thus reducing the outside wall surface to what we term 'equivalent glass surface,' and we are of the opinion that one square foot of glass surface will cool seventy-five cubic feet of air per minute. We then add to this sum the cubical contents of the room which gives us a sum the be multiplied by decimal, .013, which gives us the area of a round warm air pipe to heat this room 25 per cent

Furnace with its added radiating surface, was capable of better things than this and our tests proved to us that our furnace is capable of heating, without strain, at least one and three-quarters square inch of warm air pipe area for each square inch of grate surface.

"On the particular plan submitted, you will note the combined area of all of the warm air pipes necessary is seven hundred forty square inches. It was therefore necessary to select a furnace of sufficient capacity to supply all of these warm air pipes, and since we were absolutely certain that a Number 300 furnace will supply seven hundred sixty-eight square inches of

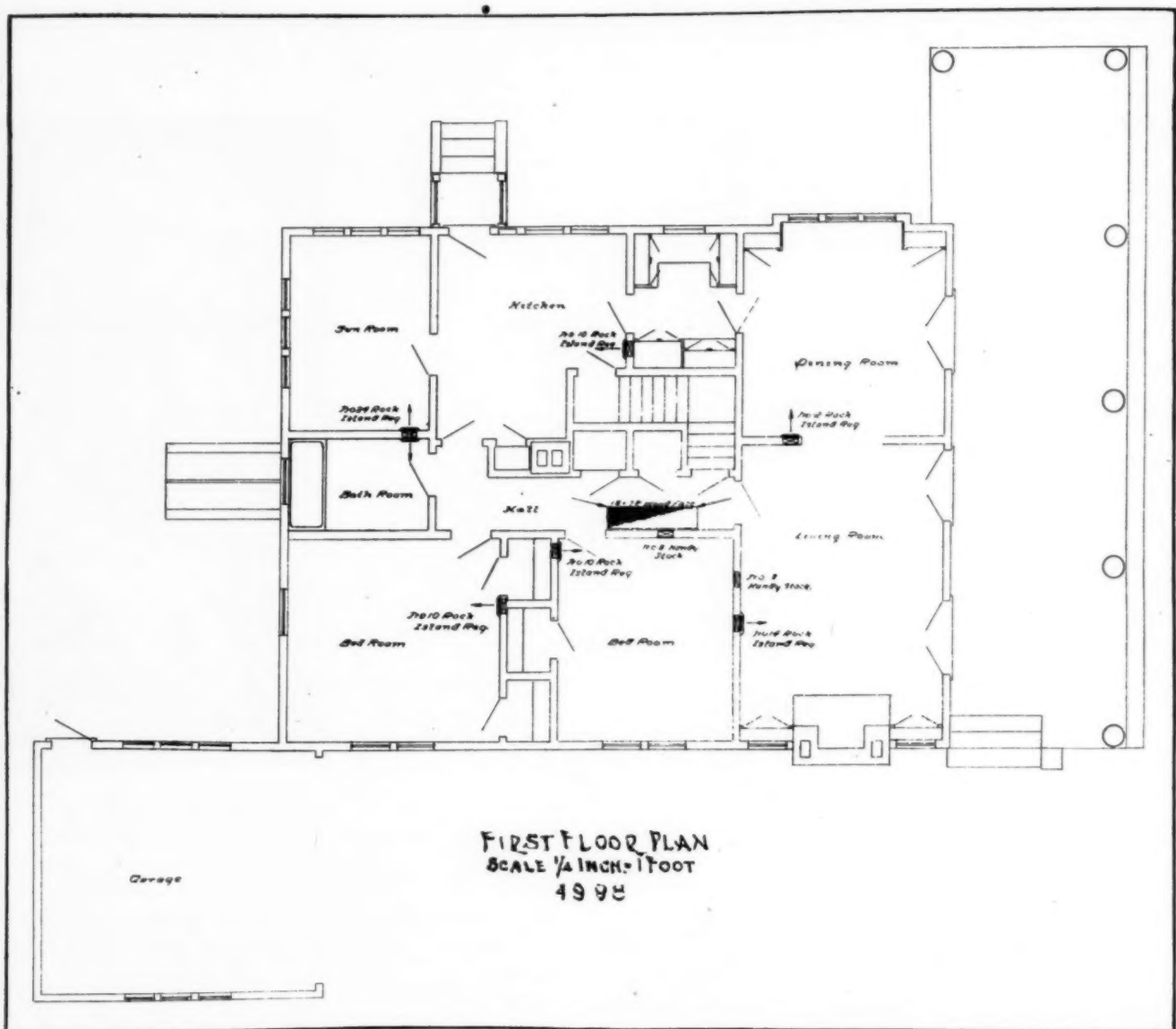


Figure 2. First Floor Plan for Warm Air Heater Installation in Home of Dirk Meyer, Pekin, Illinois, Showing Location and Size of Registers.

less for second floor rooms). We also add one inch in diameter to a round pipe for each five feet of length, over fourteen feet.

"By this method we determine the combined area of all of the warm air pipes necessary to heat a house.

"Our next problem is to select a furnace of the correct size to supply all of these warm air pipes.

"All of our furnaces are not only theoretically correct in this respect, but are given a thorough test. The theory used before the tests were made was the old-fashioned one that one square inch of grate surface was capable of heating one and one-half square inch of warm air pipe area. We were positive that the Weir

warm air pipe area, under severe, advertise conditions, we knew, beyond a shadow of a doubt, that it was capable of supplying the seven hundred forty inches necessary in this case.

"The size of the cold air pipes on this job give a free air cold air area of seven hundred six square inches, which we admit is thirty-four inches less than the combined area of all of the warm air pipes, but we do not believe that this small difference would be a detriment to the successful operation of this heating plant because we were sure, in planning this installation, that at no time would all of the warm air pipes be in operation on this particular job, at the same time.

We found, further, that by using the size cold air pipe which we did, that we could use a stock size.

"In this particular case the depth of the basement is seven and one-half feet in the clear. The Number 300 furnace is sixty inches high, and we always try to make the casing at least fourteen inches higher than the heater, thus leaving a larger reservoir above the furnace.

"This installation was no exception to the rule and therefore the top of the casing of this furnace is six feet, two inches from the floor. This would permit a slant on the warm air pipes of one foot, four inches in each respective run. However, we do not consider an excessive slant to be absolutely necessary, believing that the speed of circulation is governed entirely by the weight of the cold air in a building to be heated, and we arranged our cold air connections so that they would be more direct and unimpeded than the warm air pipes would necessarily have to be.

"Mr. Meyer did not desire any heat in the hallway. The cold air register was placed at that point in order to give the direct connection to the furnace and also to permit the excessive pressure from the various rooms throughout the house to be relieved at a central point."

Warm Air Heater Installation in Large Church Building.

An installation of warm air heating apparatus in any public or semi-public building can create more good will or do more harm to the warm air heating business than any other installation, because if the apparatus works satisfactorily, this very fact will cause favorable comment on the part of the people who visit such a building, while on the other hand, a

poorly executed job will cause just the opposite sort of remarks. Personal experience goes a long way toward creating good and bad reputation for any person or any appliance.

It was for this reason that the Engineering Department of the Peerless Foundry Company, Indianapolis, Indiana, gave very careful attention to the problem presented by one of their installers with reference to the installation of a warm air heating apparatus for a church in Celina, Ohio, and in furnishing the plans for this work, the department also provided for a ventilating system which is operated during the summer time, details of which will be described later in this article.

As will be noted from the plan of the basement, shown in Figure 1, two Peerless steel warm air heaters were placed in a separate room, separated from the other part of the basement by a thick wall. One of these had one 12-inch lead, forty feet in length, one 16-inch lead, fourteen feet long, one 18-inch lead, 26 feet long, and one 16-inch lead, twenty feet long, which furnished the heat for the front end of the church.

The other heater had three leads, respectively 16 inches in diameter and fourteen feet long, 12 inches and 18 feet long, and 12 inches by 8 feet in length, furnishing heat to the rear part.

It is also to be kept in mind that the basement was heated by the same system, as it was used for social and Sunday school purposes, rolling partitions being provided, by which the entire basement could either be thrown open into one large assembly hall or be separated in class rooms, these partitions being shown also in the basement plan.

The two heaters were fitted with 12-inch cast iron smoke stacks, the chimney being shown in the upper left hand corner of the same illustration, indicated by a small square.

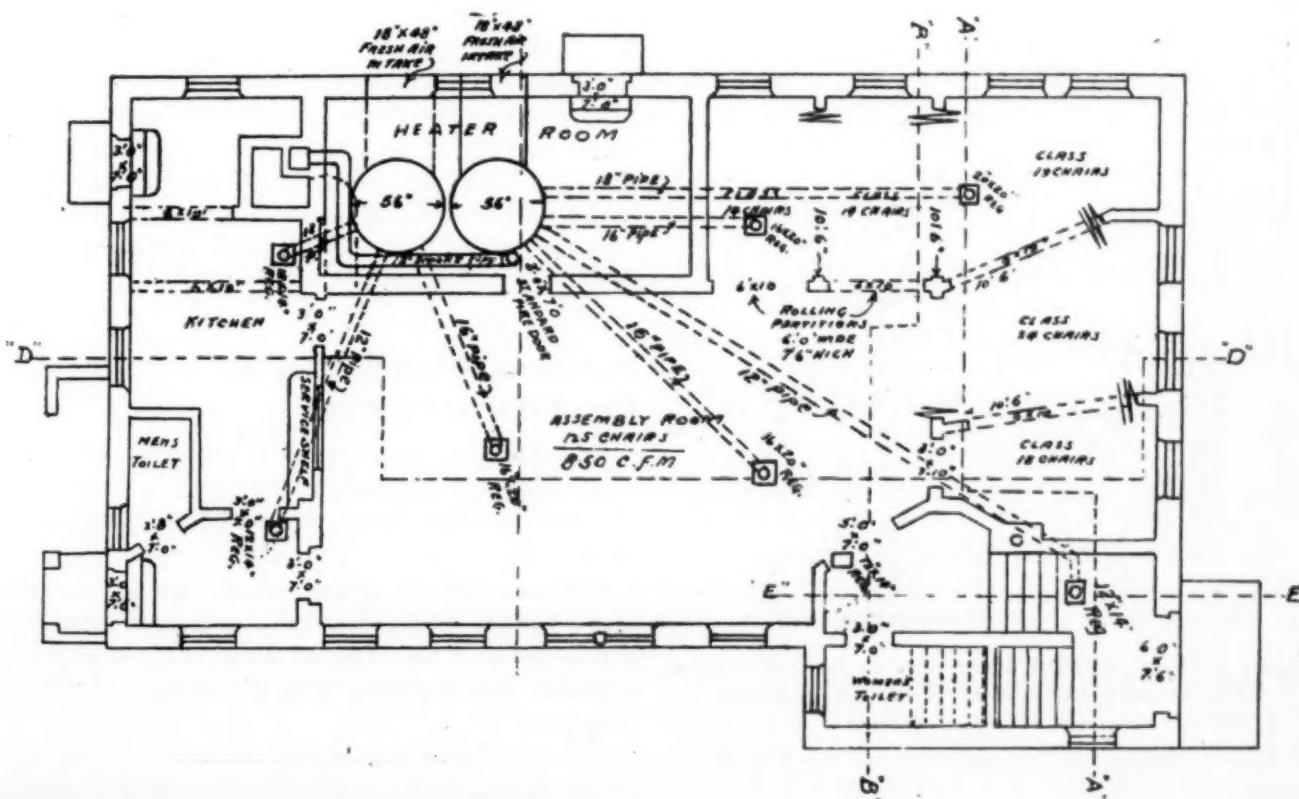


Figure 1. Basement Plan Showing Location of Warm Air Heaters, Sizes and Direction of Heating Pipes. Installation Made in Church of God, Celina, Ohio.

The plan shows a very well balanced distribution of the registers, with comparatively small sizes in the rear part, toward which the warm air will naturally be driven every time the doors in front are opened, while the registers in the front part are much larger and also fed through larger heating pipes. The installation was planned and executed to comply with the Heating and Ventilating Code of Ohio, which has served as a model for almost all other codes established by other states and individual cities.

The plan of the main floor, which is shown in Figure 2, indicates the location of the registers with regard to the arrangement of the seating facilities and the exits.

It will be noted that there are two 12 by 14 inch registers near the main entrance, of which one is in the outer hall while the other is immediately inside of the door. A third register, 20 by 20 inches, is located well to one end of the lobby. In the aisle leading off from the main entrance there are two registers, 16 by 20 inches in size, and third of the same size is placed in the other aisle. One 12 by 14 inch register is located in the choir room, while another, 12 by 14 inches

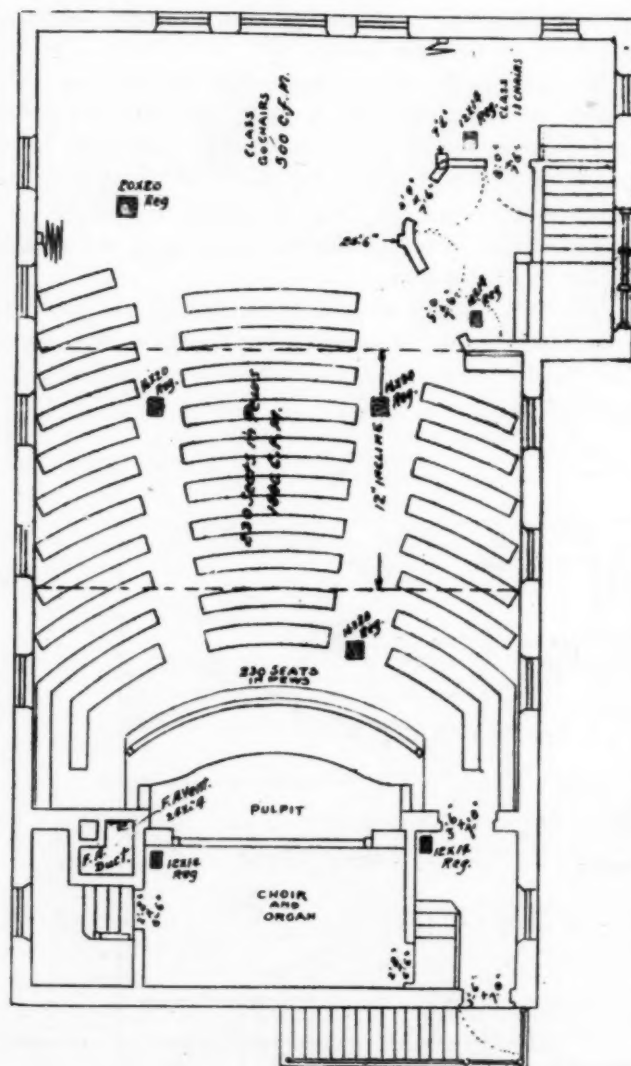


Figure 2. Plan of First Floor, Church of God, Celina, Ohio, Showing Location of Warm Air Registers.

in size, is situated in the small hall to the left of the pulpit.

Immediately to the right of the pulpit, there is a 24 by 24 inch fresh air vent, through which direct venti-

lation is furnished, especially during the summer, and in this connection, the Engineering Department devised in ingenious appliance, the details of which are given in Figure 3.

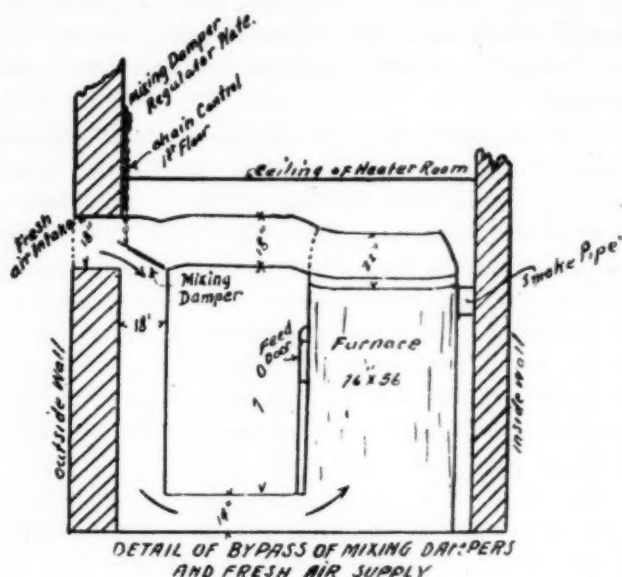


Figure 3. Details of Device for Providing Fresh Air Supply, Church of God, Celina, Ohio.

In this illustration is shown in the upper left hand corner a mixing damper and regulator plate, by means of which fresh air is supplied in varying quantities, according to the condition of the temperature outside.

By lowering this plate and adjusting the damper the amount of outside fresh air fed to the warm air heaters can easily be regulated.

When the heating system is not in operation, the mixing damper is dropped to a horizontal position, so that there is a steady supply of fresh air drawn into the top of the heaters and then through the warm air pipes into the auditorium, so that there is no need for having windows open, with the attendant annoyance of flies or dust.

J. R. Strahendorf, Manager of the Warm Air Heater Department of the Peerless Foundry Company, under whose direction these plans were drawn and the installation made, states that the Company was amply repaid for the care with which this work was done, by the large number of orders for warm air heaters which could be traced directly to this installation.

Indicates Effective Way to Use Advertising Helps.

An influential manufacturer of warm air heater accessories points out what he considers to be the most effective use of manufacturers advertising helps as follows:

"Prepare a list of prospective and active customers and mail advertising literature to them regularly at stated periods. Go direct to every class with specific appeals. The important thing is continuity of effort—keep after it."

The darkest hour in any man's career is that wherein he first fancies there is an easier way of gaining a dollar than by squarely earning it.—Horace Greeley.

There were seven bidders, of which four were lower in price than Mr. Schlatter's. But, the blue prints showing location of furnace, registers, return air faces, and piping system, together with the merits and fea-

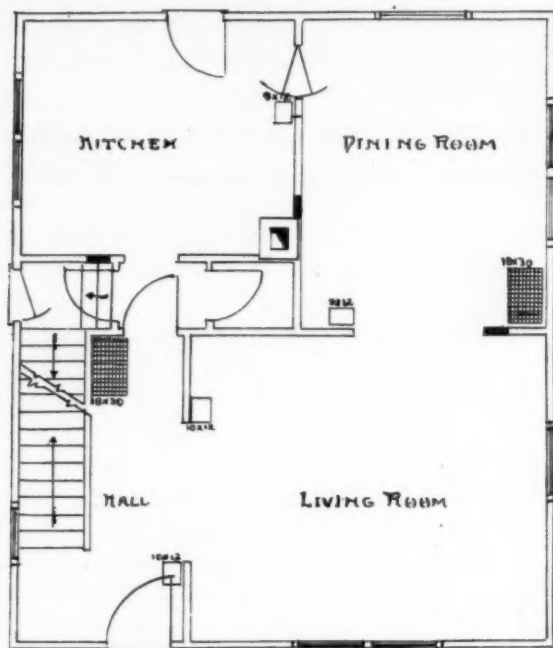


Figure 2. Plan of First Floor, Showing Location and Sizes of Warm Air Registers and Cold Air Faces.

tures of the Victor furnace as explained by Mr. Thompson, clearly convinced the board that dollars and cents were not the only factors in buying a furnace, and that heating efficiency, fuel consumption, class of material and workmanship, would save them more money in the long run than they could save on a proposition which cost less at the start but which was found to prove much more expensive in the long run.

In designing the heating system, three factors were taken into consideration—quality, service, and efficiency. This calls for a furnace of the proper size, so there will be reserve heating capacity for extreme cold weather, and not to use over 75 per cent of the square inches the furnace is capable of handling. In figuring the size of pipes to each room, their length is taken into consideration, and if a very long pipe, it is increased one or two inches in diameter so that the job when completed will balance up.

The total amount of square inches taken off the furnace in hot air pipes gives the amount of cold air to be returned. This was also figured at least 25 per cent more than necessary, which adds life to the furnace and reduces coal bills. In locating the return air faces, they took into consideration the doors, exposed walls, windows, and stairways, using two returns on all jobs, and where possible three. On some jobs where the joists ran right, they were boxed in, wherever it was possible to maintain the square inches required.

One rule was adhered to strictly—a single run of pipe to each room up and down, and double safety wall stacks. Of course, this will make the job cost more at the start, but the installer can always depend on a booster after the job is completed, and in the long run, contracts are obtained by the dealers which are not

price considerations, but where they want real heating plants that are installed according to the best rules, learned from experience.

From the basement plan of one of these houses, which is shown herewith, it will be noted that provision is made for a large amount of cold air returns, the two cold air faces giving 600 square feet and the two 18-inch cold air pipes furnishing 508 square feet, while the total amount of warm air carried is 465 square feet, thus having an allowance of nearly ten per cent.

The warm air is sent to the rooms in five 9-inch pipes and two 10-inch pipes.

The warm air heater has a tested capacity of 555 square feet of heated air, so that there is no danger of its failing to handle the distribution properly.

Another point of interest is the fact that the warm air pipes are well balanced, thus avoiding "dead" spaces in the top of the casing.

The real feature of this article should not be lost sight of—that these eighteen warm air heaters were sold at price which averaged thirty dollars each more than the lowest bid and only a few dollars lower than the highest bid.

Almost anybody will buy the better article, even at a higher price, if the matter is presented to him in the proper manner; also keep this in mind—that if you make your bid low and then "skimp" on the installation work, either by slighting the work of joining the pipes, or by using smaller pipes, or by putting in a smaller heater, or by any other means, you will only make a

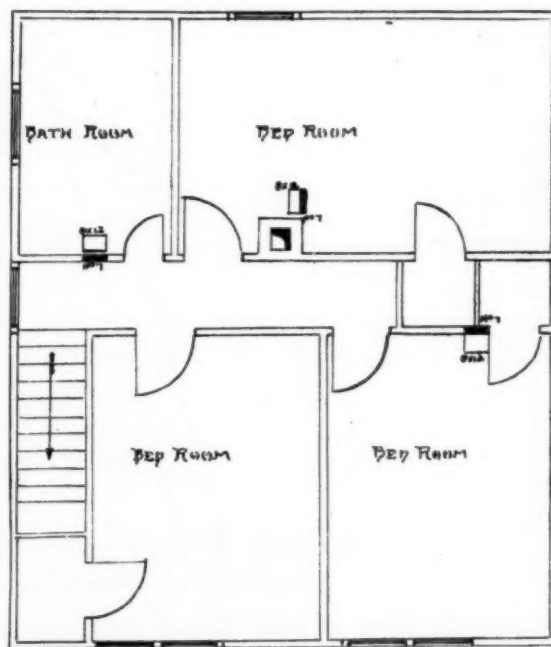


Figure 3. Second Floor Plan, Showing Location and Sizes of Warm Air Registers.

"knocker" instead of a "booster" out of the customer for whom you installed the apparatus—and furthermore, you will make it more difficult for any one to sell a warm air heater to this man's friends.

No incompetent proprietor ever succeeds in keeping for long the kind of help he most needs, the competent kind.

Warm Air Heater Provides Warmth and Ventilation for Theater.

A building which is occupied for a considerable period of time by large numbers of people must be provided with some automatic system of ventilation which will operate satisfactorily under all circumstances. When such a system is based upon a properly installed warm air heating apparatus, its action can always be depended upon to give satisfaction.

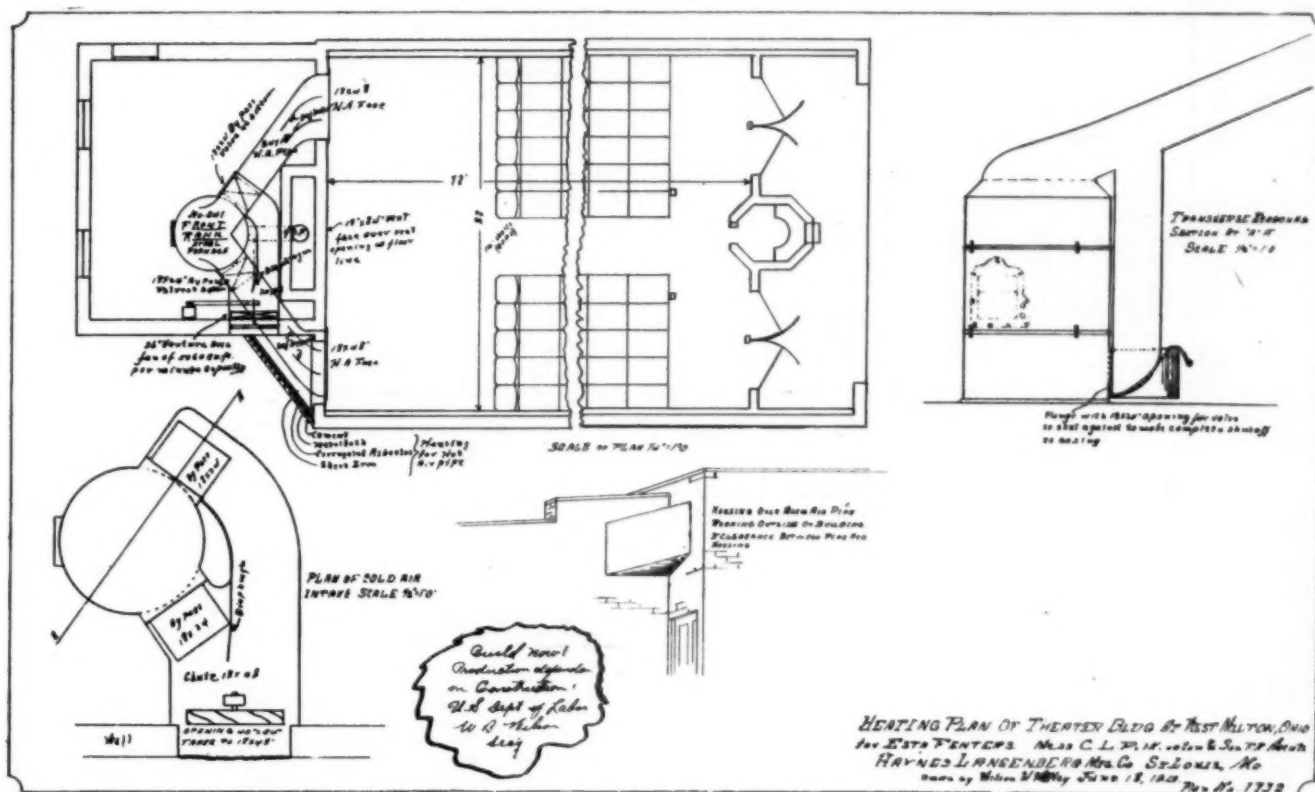
The chief problem which confronted C. L. Pilkington and Son, West Milton, Ohio, installers of Front Rank warm air heaters, in connection with the new moving picture theater which was being put up in their city was that there was no basement under the building. This was solved by placing the warm air heater with ventilating fan attachment in a small build-

pany, Cincinnati, Ohio); over that a layer of metal lath, and as an outside covering a thick plaster of cement. There is a 3 inch clearance between the warm air pipe and the housing.

A large space was provided in the building for a vent shaft and the smoke pipe made of heavy sheet metal is run through the center of this shaft, thus assisting in obtaining positive ventilation without the necessity of an exhaust fan.

Specifications required in accordance with the Ohio State Code that the air must be changed six times per hour. It is also provided that the fan must be capable of delivering 5,020 cubic feet of air per minute.

By means of a bypass connecting the cold air intake and the warm air outlet, the apparatus is used as a ventilating system during the summertime. The rapidly moving air taken directly from outside is cooled



Plan for Warm Air Heater and Ventilating Apparatus Installed in Moving Picture Theatre by C. L. Pilkington and Son, West Milton, Ohio.

ing at the rear of the theater proper, as shown in the accompanying illustration, the drawings and the general plans being prepared by the Engineering Department of the Haynes-Langenberg Manufacturing Company, St. Louis, Missouri, makers of Front Rank warm air heaters and fittings.

It will be noted that only two warm air pipes are used in this installation, and in this connection attention is called to the fact that a peculiar condition had to be met was that the heating room could not be extended to the width of the main building, due to an exit door being placed in the wall of the main building. This difficulty was overcome by constructing a "housing," details of which are shown in the main drawing and also in the smaller drawing just below the general layout (in the center).

This housing was made in four layers—first, a galvanized sheet; then a sheet of corrugated asbestos, ("Asbestair," manufactured by the Philip Carey Com-

pany, Cincinnati, Ohio); over that a layer of metal lath, and as an outside covering a thick plaster of cement. There is a 3 inch clearance between the warm air pipe and the housing.

Attention is called to the simplicity of the completed plant which provides heat, ventilation and cool air with the minimum amount of equipment.

Furnace Installer Outlines His Business Creed.

Worthy of general adoption by the trade is the business creed of B. F. Stow, Wyanet, Illinois.

He condenses it into three essential paragraphs, as follows:

1. Larger furnaces of best makes.
2. More air capacity within furnace casings.
3. Larger air pipes from and to the heater with registers and faces to correspond.

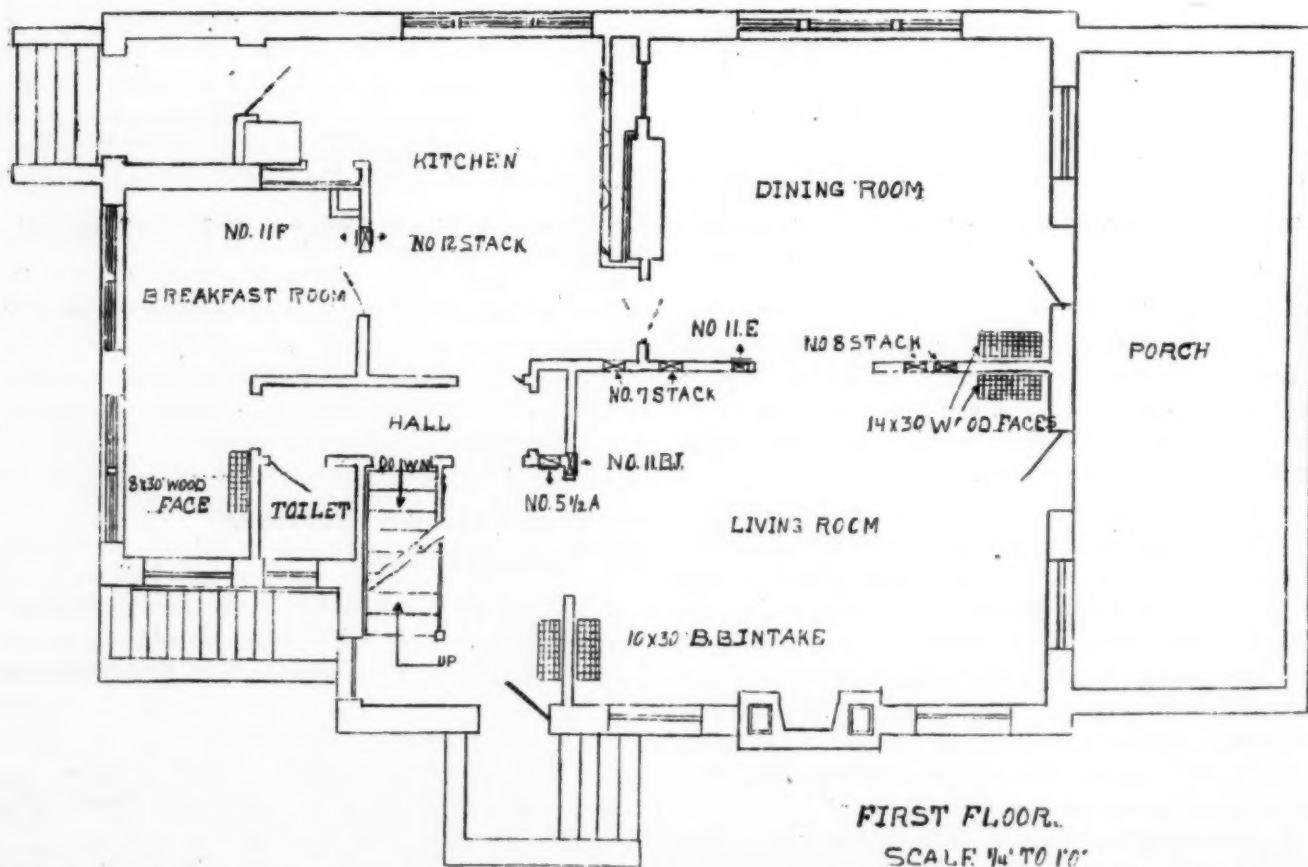
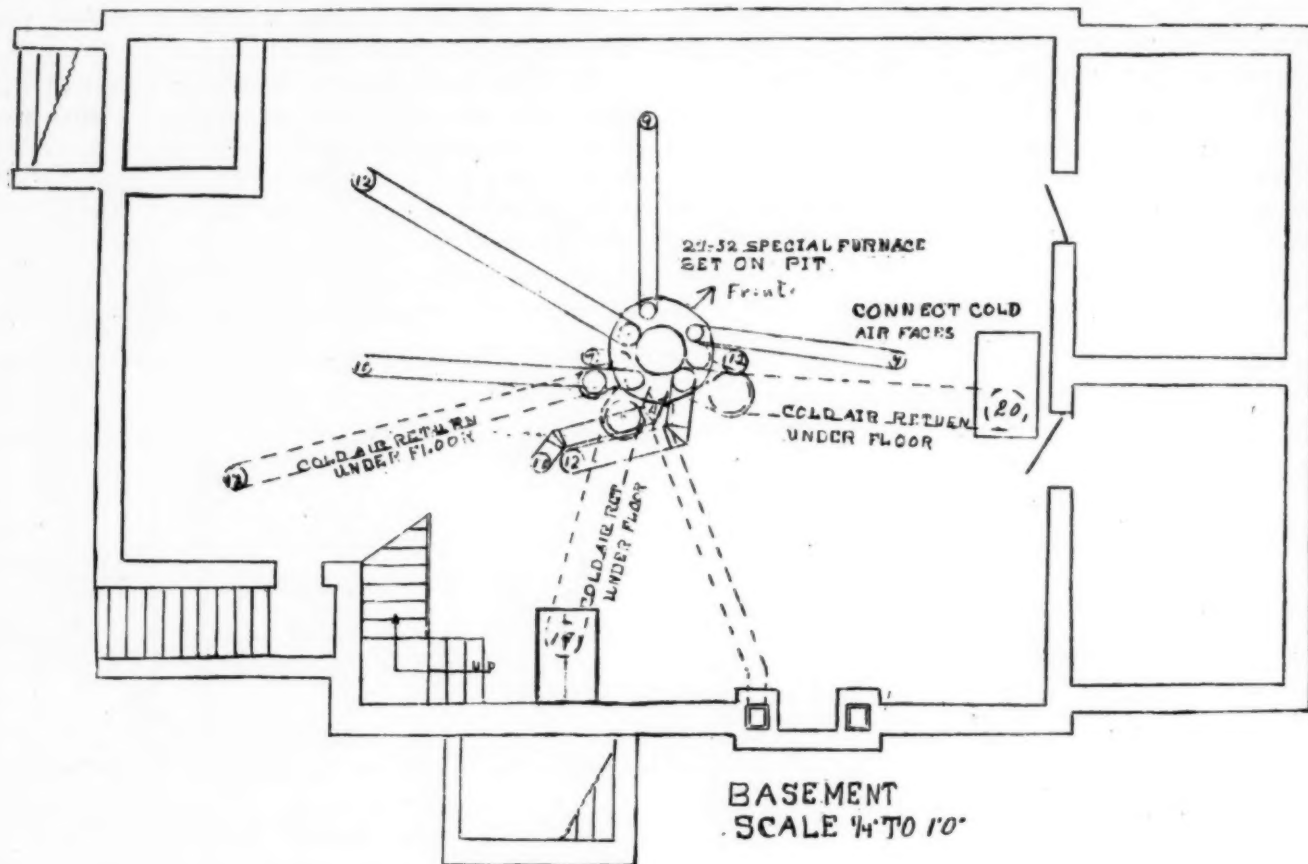
You can walk farther in a day than you can run.

Warm Air Heater Installation That Has Stood Severe Test.

There are many opportunities to plan more satisfactory jobs at lower installation costs if blueprints or sketches are sent in with the dealer's suggestions, giving

them the privilege of making such changes as their experience shows are necessary.

We have procured a set of floor plans which we are reproducing. This set shows a typical job laid out by the Engineering Department of The Excelsior Steel Furnace Company, Chicago, Illinois, and we prefer to



Basement and First Floor Plans for Warm Air Heater Installation in Two-Story and Basement House. Showing Location of Heater, Pipes and Register and Sizes of Same.

describe this installation in their own language, as follows:

"Here is a layout of a job installed in a well constructed home. While not as ideal as we wished, we had an opportunity to check it up last winter, and prove to ourselves as well as to the owner that our theories were correct.

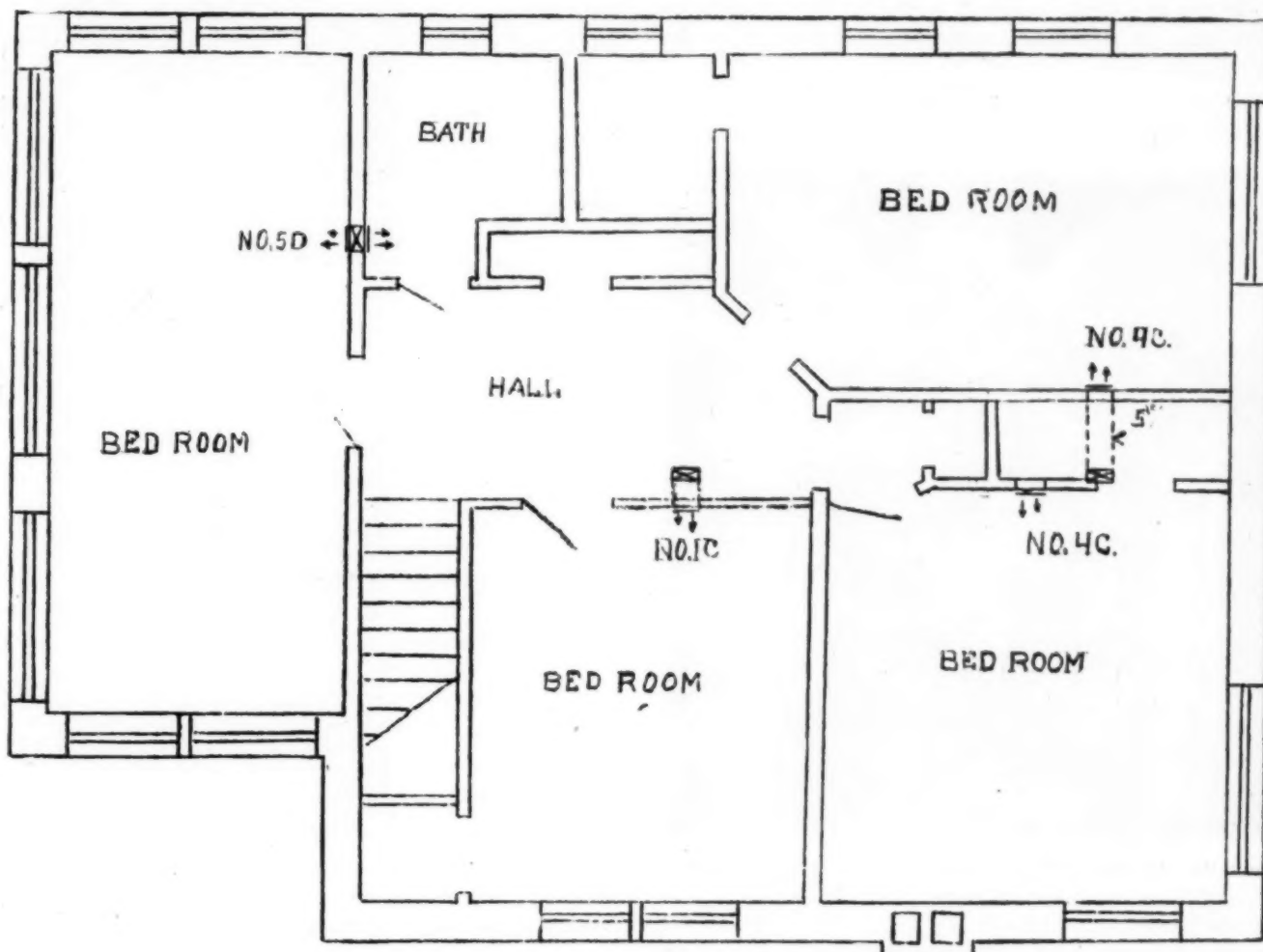
"In the first place the building is very uniformly heated with the exception of the kitchen, same being on northwest side and subject to the severest cold and wind.

hour firing periods with Illinois soft coal.

"We also call attention to the large room on second floor at the front of house marked 'bedroom.' This is a sleeping porch and was not intended to be heated to any particular degree of temperature.

"The owner wished to take advantage of the stack to bath room and only supplied heat to the sleeping porch during the day when all windows were closed, thereby having the beds more comfortable for the occupants when retiring.

"As stated above, the owner is very well pleased



Second Floor Plan of Warm Air Heater Installation. Showing Location of Registers.

"We wanted to install the cold air return in the kitchen near the outside door and avoid any cold drafts retarding the flow of warm air. The owner, however, insisted he would take his chances and we placed the return on the opposite side of the house.

"In testing the job we found that regardless of which door (there are three) was left open for the exit of cold air from the kitchen the cold air pressure was sufficient to retard the warm air, but by placing a shield in front of the register this room has been heated satisfactorily.

"Unfortunately, there was an unusual amount of leakage from the rear door and the owner expects to have the same made tight and also place a storm door on same.

"This, of course, makes conditions better but will in no case be as satisfactory as if a cold air return had been placed at the cold joint. The air circulates very freely through all pipes and owner has been able to operate the system in zero weather on from 8 to 12

with his heater. He formerly was an advocate of hot water heating, but with his experience with this installation is an ardent advocate of Warm Air Heating."

Parker Supply Company Reduces Prices Ten Per Cent.

In line with its policy of giving customers the benefit of market declines, the Parker Supply Company, 780 East 135th Street, New York, wishes to announce a reduction of 10 per cent in the price of the various Parker products. This reduction is to be effective January 2, 1921.

No business ever succeeded except on the new-starts-and-as-many-of-'em-as-may-be-needed principle.

Wisdom doesn't think folly is any rasher than folly thinks wisdom is duller.

Emphasizes Importance of Warm Air Furnace Insulation.

By W. L. Steffens, Manager of Insulation Department of the Philip Carey Company Cincinnati, Ohio.

Until the early part of 1920 very little was known about the heat radiation losses from warm air furnaces or the savings to be made by stopping those losses. The entire trade and consuming public are indebted to the National Warm Air Heating and Ventilating Association and their research staff for the valuable information on this subject developed at the University of Illinois.

In an average size installation containing 150 square feet of leader surface, which is equivalent to from 50



Installer Applying Magnesia Cement on Sloping Part of Casing.

to 60 lineal feet of leaders, the heat loss in one month of cold weather when leaders are covered with plain asbestos paper only, can easily account for 1,800 pounds of coal. While the University of Illinois tests on losses from the jacket of the furnace itself are not yet completed, it is quite evident that in the average size furnace installation the loss may be as great or even greater than the loss from the leaders. Fortunately, the heat that escapes from these surfaces is not all lost, as some of it eventually works up into the house.

There are entirely too many warm air furnace owners, however, who have just cause for complaint that their cellars are too warm; that heat escaping in the cellar if delivered upstairs would be the source of considerable satisfaction.

It is probably conservative to say that from 1 to 2 tons of coal can be saved per heating season by insulating the leaders and that an equivalent amount can be saved by insulating the furnace jacket. These are substantial savings. In general, they pay for the cost of the installation in one year and seldom are more than two years required.

A cool cellar for vegetable and preserve storage, and the extra heating capacity obtained by forcing practically all the heat into the house, are also valuable considerations. It should be borne in mind that the heat saving properties of insulating materials are inherent qualities of those materials and not subject to any change. Mechanical devices for obtaining fuel economy may get out of order or may give results in proportion to the amount of attention given them, but heat insulating material once applied gives the same results year after year as long as the furnace installation lasts.

Heating engineers and architects are beginning to recognize the necessity and value of insulating warm air furnace pipes and jackets. In a recent issue of the *Builders' Journal* Maurice M. Osborne, in a special article on "Hot Air Heating for Houses," says: "The exterior of the furnace should be covered with asbestos air cell covering or, still better, 1-inch magnesia blocks wired on and finished with hard cement. If the outer metal covering of the furnace is double, with an interlining of asbestos, this is not necessary. Leaders in the basement and vertical stacks should be covered with asbestos air cell covering, wired on or held with bands."

The University of Illinois tests clearly indicated that, for the leaders, corrugated asbestos paper is the simplest to apply, the least expensive and the most practical material. One or two layers can be used, but three layers ($\frac{3}{4}$ -inch thickness) seems to be the proper amount for best results. A good method for insulating warm air furnaces is as follows:

Cover the leaders, including bends and elbows from the body of the furnace to the risers, with 3 layers of corrugated asbestos paper, each layer being securely held in place with light wire loops spaced on approximately 9-inch centers. The edges of the paper should butt together, not lap. Apply each layer so that the butt joints and horizontal seams will not fall over those of the previous layer. Finish all seams and joints of the outer layer with strips of flat asbestos paper pasted on, to give a smooth, neat finish.

Partially fill the hollow portion at the top of the furnace with sand; the last 2 inches of the fill should be made with dry 85 per cent magnesia cement. Cover the body of the furnace from the top ring downward a distance of 36 inches, with 3 ply ($\frac{3}{4}$ -inch thick) asbestos air cell blocks 12 inches wide by 36 inches long curved to fit the body of the furnace. Hold these in place with 3 wire loops tightly stretched, one at the top, one at the bottom and one at the center of the blocks. Finish the block joints with narrow strips of asbestos paper pasted on.

Cover the sloping portion of the top with approximately $\frac{3}{4}$ -inch thickness of 85 per cent magnesia cement troweled on. *Do not use so-called asbestos cements. They are usually nothing but clay and a very short cheap grade of asbestos fibre.* Eighty-five per cent magnesia cement is the only kind that should ever be used at the top of the furnace where the real intense heat is found and where a real heat insulator of the highest quality is needed. The amount of cement needed for a single job is very small, consequently the cheaper and inferior grade should never be used.

The insulation of warm air furnaces and leaders means a big saving to the householder, more work for the furnace erector and a more satisfactory heating device in every respect.

Furnace Salesman Meets With Uncommon Success.

Knowledge of salesmanship is necessary to success in marketing commodities. But there are two other factors of equal importance, namely, friendliness and good cheer.



Thomas I. Peacock.

The big men of the selling world are the friendly men. No one has ever yet achieved notable success as a salesman who lacked pleasant manners and who showed no interest in the purely human side of the transactions.

Once in a while we meet persons who profess to believe that there is some mysterious knack of salesmanship, some strange magnetism by which

one man succeeds in the same circumstances where another man of apparently equal talent fails.

But, the truth is that salesmanship is a matter of knowledge of the commodity, honesty of purpose, sincere interest in the customer, friendliness and agreeable manners.

These are not only virtues, they are also attainments that can be cultivated.

It is because he is naturally friendly and of buoyant disposition as well as sincere and studious that Thomas I. ("Gilt Edge") Peacock, has met with remarkable success as a furnace salesman. He has been sales representative for R. J. Schwab and Sons Company, Milwaukee, Wisconsin, during the past four years, covering Michigan, Northern Ohio, and Indiana.

In connection with his work as salesman, he has found time to help the Michigan Sheet Metal Contractors' Association in membership campaigns. He has been and is an enthusiastic worker in behalf of the Salesmen's Auxiliary to the Michigan Sheet Metal Contractors' Association.

Frequently, he makes addresses to various locals of sheet metal contractors in his sales territory on topics concerning the welfare of the trade.

He has a sunny temperament—not due entirely to the years which he spent in California, where for six years he was interested in the manufacture and selling of the Perfection Gas Furnace at Los Angeles.

Mr. Peacock is looking forward to a much larger business next year. He knows that the furnace which he sells is a sound and satisfying product. He feels that the straightforward truth as to its merits is the best selling argument that he can devise.

He could not continue to increase the number of his friends and customers week after week if it were otherwise.

Is a New Addition to a Live Organization.

In order to keep pace with the steady, rapid growth of their Wood Cold Air Face business, The Marsh Lumber Company of Dover, Ohio, recently made arrangements whereby Mr. H. E. Marsh became affiliated with them.



H. E. Marsh, Sales Manager of The Marsh Lumber Company, Dover, Ohio.

He took charge of the sales and of their business on October first, and is the fifth brother to become an active worker in the new company which was formed early in the year by the consolidation of The Garber-Marsh Lumber Company and The Dover Wood Face and Lumber Company.

The Marsh Lumber Company stock is owned by the six members of the organization, all of whom are actively engaged in the following capacities: A. C. Marsh, President; F. J. Huff, Vice President; W. P. Marsh, Secretary; J. H. Marsh, Treasurer; J. J. Marsh, Assistant Secretary; and H. E. Marsh, Manager of Sales.

They built a new plant this past summer, and have so equipped it with new machinery especially designed for the manufacture of Wood Cold Air Faces, that they have increased their capacity approximately 300 per cent, in order to keep pace with the rapid growth of their business.

The special machinery also enables them to produce a much higher grade product than would otherwise be possible.

The Marsh Lumber Company is an organization of young live wires who believe in giving the kind of service and quality and the kind of fair treatment that make it a pleasure to do business with them, and they have our very best wishes for their continued success.

The man who lacks confidence in his own ability to succeed will find his lack of confidence shared by almost everyone else he meets.

Practical Helps for Tinsmiths

No Two Jobs Are Exactly Alike. Therefore, the Sheet Metal Worker Has to Meet Each Difficulty as It Comes. Send Your Problems to Us. Let Our Experts Help You.

PATTERNS FOR SPHERES.

By O. W. Kothe, Principal St. Louis Technical Institute and Instructor in the David Rankin, Jr., School of Mechanical Trades, St. Louis, Missouri. Written especially for American Artisan and Hardware Record.

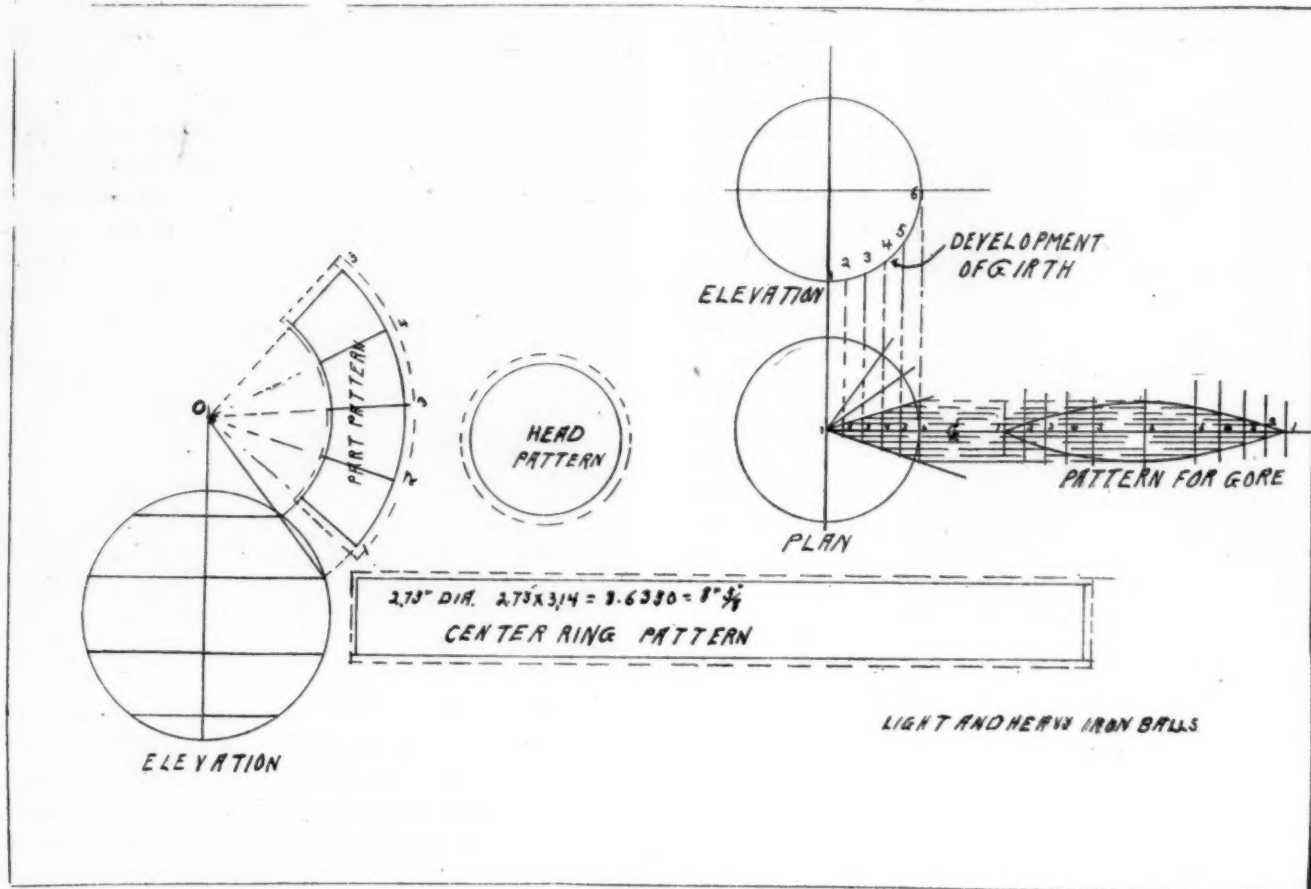
When a workman makes a sphere it often puzzles him which method to apply; the zone method or the gore method.

The zone method is the most suitable for all around

lowed; but lines are described so the belts can be held straight.

The circumference of the middle belt is made equal to the diameter of sphere times 3.1416, and is 8.58 inches in this case.

The second belt is made to conform to this girth, and, after the belts are shaped up, it is often necessary to take up a bit of girth or layout one or the other belts a bit.



Patterns for Spheres.

work. It is easier to assemble, quicker, and is considerably stronger.

The gore method is generally made in so many pieces, that it is hard to put the curvature in the pieces, and this also helps to elongate the sphere from pole to pole, rather than absolutely round.

To set out the belt method, first draw the elevation and divide the body up so the middle belt will be a straight strip.

The other flaring belts are made the same as a funnel or any true flaring article and is described from 0 in this case. The dished top is set out equal to the radius of the slant height.

These belts must be bumped out to conform to the curvature of outline of elevation. A little edge is al-

This is done so a snug fit is produced, and no buckles are forced in the one edge.

The gore method is very simple, a quarter of the elevation is divided in equal spaces and lines are dropped to the center line of plan.

The miter lines in plan are set apart at such widths as you desire.

That is, the ball is divided in say 12 equal parts, then one part would be straddled over the center line of plan, and this is the gore.

From elevation drop lines to cut these miter lines as shown. Then pick the girth from 1-6 of elevation and set it off as 1-1 in pattern.

Draw stretchout lines, and from each point in miter lines project lines to intersect those of similar number in stretchout.

Trace a line through these points and the gore is finished. A small lap is allowed for soldering. Each gore is bumped to suit the curvature of ball.

Enough of these patterns are cut out to make the ball, and all are bumped out, rounded out, and the gores are then assembled.

Interview with the President of Parker Supply Company.

Here is an interview with the President of the Parker Supply Company, manufacturers of Parker products.

The Parker Supply Company of New York was organized in 1912 by its President, Hyman Rosenberg, as the outcome of his connection with the sheet metal industry.

For many years prior to the inception of this Company, and until the early part of 1918, at which time he retired from the sheet metal business, Mr. Rosenberg was President of the Parker Sheet Metal Works, another corporation which was organized by him. Through this connection he had taken part in the construction and erection of some of the largest heating and ventilating systems in the country.

The present Company was originally organized for the manufacture of Parker Hardened Sheet Metal Screws, as readers may recall, in a small loft at 517 West 45th street, New York City.

The rapid growth of the organization, through the adoption of the various products by the trade, necessitated the procuring of larger floor space. In 1915 a building extending from 135th to 136th street with a floor space of about 20,000 square feet was leased. Additional machinery of the latest type and construction was also installed, so that the demand of the trade would be satisfied.

We also understand that the Parker Supply Company contemplates the erection of a building to facilitate the handling and manufacturing of the Parker products, for which the demand is constantly growing.

The Hardened Sheet Metal Screws, as apparent from the many unsolicited testimonials received by the manufacturers are conclusive proof of the enormous savings incurred in their use for joining and making fastenings to metal. Fully 80 per cent of the tinners' supply jobbers throughout the country now carry

the screws as well as other Parker products, among which are:

Parker Damper Quadrant.

Parker Dial Damper Regulator.

Parker Metal Hand Punches.

Parker Combination Bench and Hand Punch.

Parker Sure Grip File Holder, etc., etc.

These and other products are being used extensively in most of sheet metal shops.

In our interview with Mr. Rosenberg, he attributes his success and high standing in the sheet metal industry mainly to the fine training afforded him in the various Evening Trade Schools in the city of New York.

It was there that his mechanical ability was developed, and he praised highly the opportunities that the Trade Schools offer to young men that are inclined to follow the mechanical field.

Readers and users that have adopted the various devices of Mr. Rosenberg's invention, in connection with their work, will agree that they have proved time and labor savers in every sense of the term.

In concluding mention may be made of the effective advertising of the Parker products, which has been a big asset in the growth of the above company. The contention of Mr. C. S. Trott, advertising manager, is that intensive and extensive advertising goes a great way, not only to acquaint the trade with Parker products but to increase the usage of the many time and labor saving devices manufactured by the Parker Supply Company.



Hyman Rosenberg, President The Parker Supply Company.

Wants Bottom for Wheat Tank.

TO AMERICAN ARTISAN AND HARDWARE RECORD:

I am enclosing drawing for a wheat tank.

The tank is sixty-four inches in diameter, and the opening $6\frac{1}{2} \times 14$ inches.

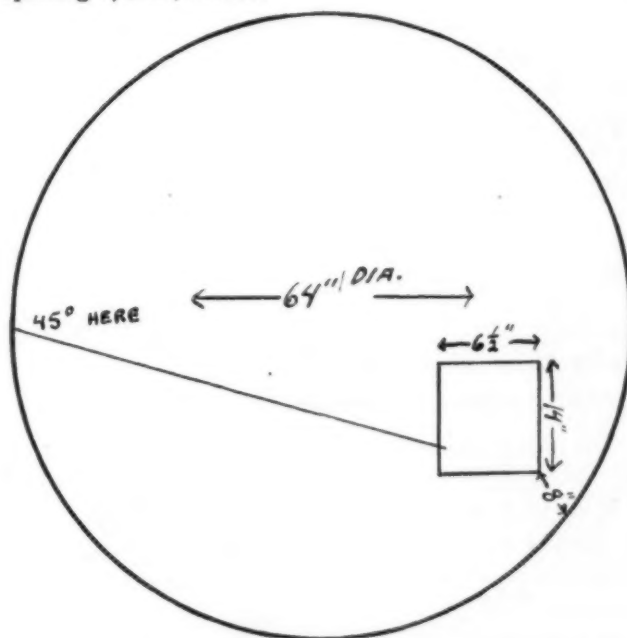


Diagram of Problem.

I want a bottom on the inside on a 45 degree.

I would like a square opening in the bottom $6\frac{1}{2} \times 14$ inches which is eight inches from the tank.

Would like a drawing on this problem.

J. M. CAMPBELL,

Lincoln, Nebraska, December 12, 1920.

Instructive Notes and Queries

The Service of This Information Bureau Is Free to Our Subscribers and They Are Urged to Use It Freely.

Describes How to Color Soft Solder the Same as Copper.

For giving the solder used in soldering copper the same color as the latter, prepare first a saturated solution of pure sulphate of copper and apply it to the solder.

By then touching the solder with an iron or steel wire it becomes covered with a film of copper which may be augmented as much as desired by repeated moistening with the solution of copper and touching with the wire.

If the soldering is to show a yellow color mix 1 part of saturated solution of sulphate of zinc with 2 parts of solution of sulphate of copper, apply the mixture to the coppered place and rub the latter with a zinc rod.

If the soldered place is to be gilded, copper it as above described, then coat with solution of gum or isinglass and scatter bronze powder upon it.

This forms a surface which, when the gum is dry, can be polished.

Gives Directions for Making Solder.

The soft solder most frequently used, consists of two parts tin and one of lead. A cheaper solder is formed by increasing the proportion of lead; $1\frac{1}{2}$ tin and one lead is the most fusible solder unless bismuth be added.

To prepare soft solder, first melt the tin, best in a porcelain or stone vessel, as with the use of an iron vessel, there is danger of the absorption of iron by the solder. The tin being completely melted, add the lead in small portions and combine the two metals by stirring with a stick of wood. Then pour the finished alloys into suitable moulds, the best shaped being that of thin bars about $7\frac{3}{4}$ by $1\frac{1}{2}$ inches and $\frac{1}{8}$ by $\frac{1}{4}$ inches in thickness.

Tells How to Prepare Solder for Aluminum Bronze.

The important ingredient in the preparation of solder for aluminum bronze is zinc amalgam.

The zinc amalgam is used with ordinary soft solder in varying proportions—the one most commonly used being ordinary soft solder, two parts and zinc amalgam one part.

It is easy to prepare zinc amalgam for use in this solder. Zinc amalgam is an alloy of zinc and mercury.

It is prepared by adding two parts of pure zinc to one of mercury, thoroughly stirring, cooling it off as quickly as possible.

Zinc amalgam when cold forms a very brittle alloy which has a silver white color.

In the making of the solder for aluminum bronze,

the ordinary soft solder is first melted and then the finely powdered zinc amalgam and the whole mixture is poured at once into the moulds.

Tells How to Soften Old Putty.

A good way to make the putty soft and plastic enough in a few hours so that it can be taken off like fresh putty, is by the use of kerosene, which entirely dissolves the linseed oil of the putty, transformed into rosin, and quickly penetrates it.

Reports on Tin in Alaska.

About 31 tons of stream tin concentrates were mined in Alaska in 1920, compared with 86 tons in 1919, according to the United States Geological Survey.

Most of this tin was mined in the York district, at the west end of Seward Peninsula, where one dredge and several small operators were working on placer tin deposits.

Several tons of stream tin were also recovered from gold-placer mining operations in the Hot Springs and Ruby districts, but this was not shipped.

A total of 35 tons of stream tin was shipped from Alaska in 1920, but a considerable part of this was mined in previous years.

* * *

Wire Brushes.

From George C. Powers, President Pioneer Metal and Plumbing Company, 630 East Grand Avenue, Des Moines, Iowa.

We would like to know who manufactures wire brushes of all kinds to use in cleaning radiators.

Ans.—Western Brush Company, 24 North Wells Street, Chicago, Illinois; F. L. Curfman Manufacturing Company, Maryville, Missouri.

Aquariums Manufacturers.

From B. T. Wood, 1504 East 26th Street, Minneapolis, Minnesota.

Please give me the names of manufacturers of aquariums.

Ans.—Co-Operative Flint Glass Company, Beaver Falls, Pennsylvania; J. W. Fiske Iron Works, 80 Park Place, New York City.

Address Morse Chain Company.

From J. Oscar Smith, 537 Reed Street, Moberly, Missouri.

Can you tell me where the Morse Chain Company, manufacturers of the silent running "Morse" chain, are located.

Ans.—Ithaca, New York.

Wire Brushes.

From Harry L. Wood, Premier Warm Air Heater Company, Dowagiac, Michigan.

Kindly inform us who manufactures a wire brush for cleaning radiators.

Ans.—F. L. Curfman Manufacturing Company, Maryville, Missouri; Western Brush Company, 24 North Wells Street, Chicago, Illinois.

Illustrations of New Patents

Watch This Page. Keep Yourself Informed Concerning Improved Devices Which May Save Labor in Your Shop or Add Another Source of Income to Your Retail Store.

1,358,287. Fastening Means for Oven Doors and the Like. Lee S. Chadwick, East Cleveland, and Carl C. Rehmer, Cleveland, Ohio, assignors to The Cleveland Metal Products Company, Cleveland, Ohio, a Corporation of Ohio. Filed March 15, 1919.

1,358,299. Underreamer. William C. Cutler, North Glendale, Calif. Filed January 12, 1920.

1,358,314. Chimney-Cowl. Mary Jezova, Wallis, Texas. Filed June 4, 1920.

1,358,321. Calipers. Joseph Wencelass Lovell, St. Catharines, Ontario, Canada. Filed November 25, 1919.

1,358,369. Broom. William Henry Forester, Portage La Prairie, Manitoba, Canada, assignor of one-half to George Francis Bailey, Toronto, Ontario, Canada. Filed October 25, 1919.

1,358,382. Fishing Reel. Lewis P. Mallow, Laona, Wisconsin. Filed October 15, 1919.

1,358,399. Mop Holder. Henry J. Sommer and Jacob Reigh, Hollidaysburg, Pa. Filed April 26, 1920.

1,358,405. Washing Machine. Henry H. Young and Walter E. Young, Kearney, Nebr. Filed January 18, 1919.

1,358,445. Combination Lock. Stephen Hermanowich, Eilwood City, Pa. Filed March 27, 1920.

1,358,507. Washing Machine. Patrick John Berford, Sprankles Mills, Pa. Filed November 14, 1919.

1,358,545. Auger. Charles Henry, Manayunk, Pa. Filed May 7, 1920.

1,358,591. Ice Skate. Mellen Ulysses Smart, Allston, Mass. Filed February 13, 1920.

1,358,597. Shaving Brush. Leon Tobias, New York, N. Y. Filed March 22, 1920.

1,358,601. Washing Machine. Edward F. Wittuhn, Appleton, Wis. Filed August 14, 1919.

1,358,710. Gate Hinge. James Edward Day, Isabella, Manitoba, Canada. Filed March 26, 1919.

1,358,746. Juvenile Car. Andrew S. Jones, Spokane, Wash. Filed March 1, 1920.

1,358,749. Animal Trap. Robert E. Jones, Bremer-ton, Wash. Filed January 17, 1920.

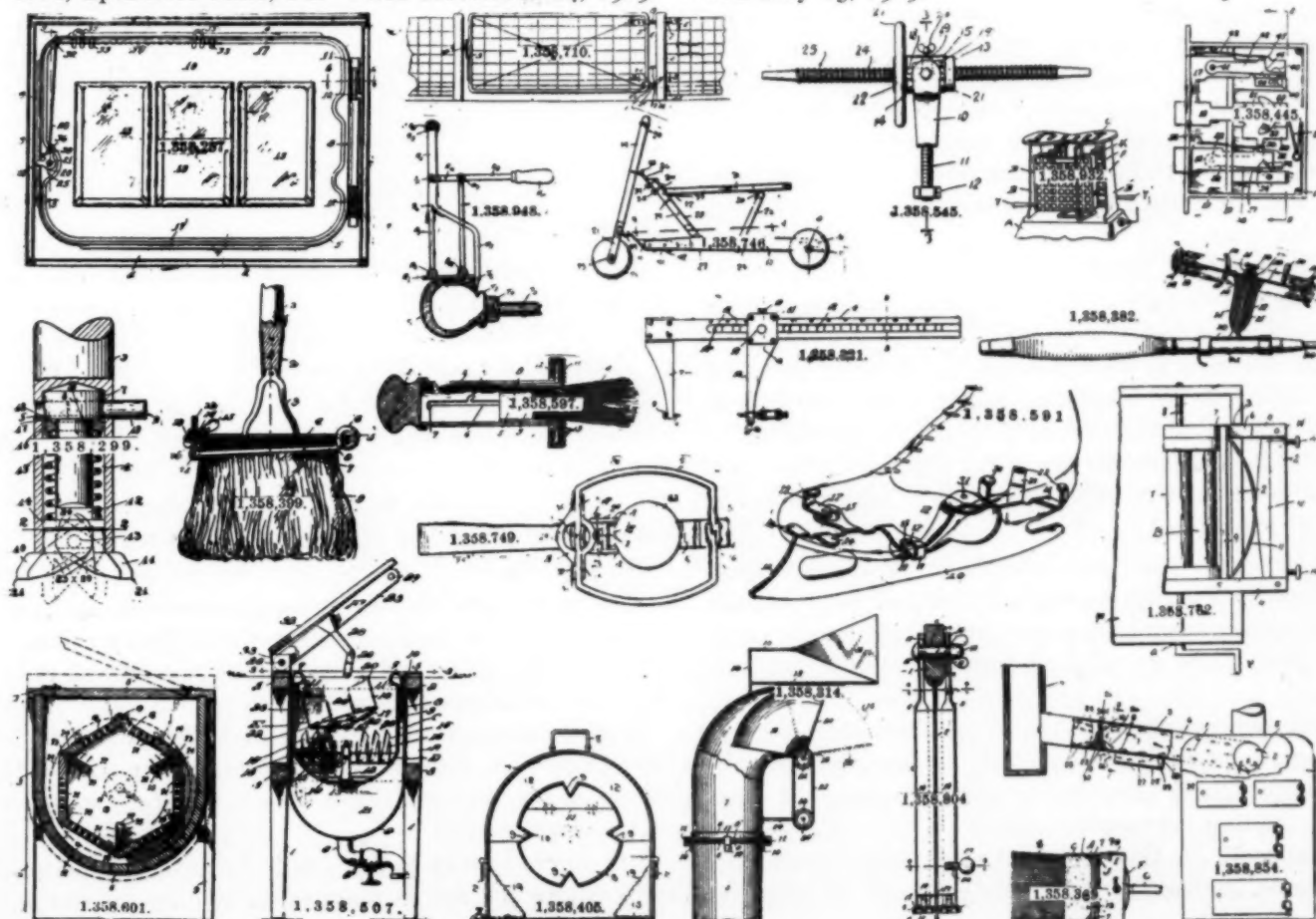
1,358,762. Combined Wringer and Washtub. Katherine M. Longworth, Jersey City, N. J. Filed August 17, 1918.

1,358,804. Window Cleaning Device. Harry Waywell, Cleveland, Ohio. Filed July 24, 1919.

1,358,854. Draft Regulating Apparatus. John F. Kendall, Brooklyn, N. Y. Filed October 10, 1918.

1,358,932. Toaster. Frederick William Collier, Worcester, Mass., assignor to Economy Appliance Company, Marlboro, Mass., a Corporation of Massachusetts. Filed February 15, 1917.

1,358,948. Tire Tool. John F. Giese, Portland, Ore. Filed May 15, 1919.



Weekly Report of the Markets

General Conditions in the Steel Industry. Review of Prices and Tendencies in Sheet Metals, Pig Iron, etc.

OPINIONS DIFFER AS TO RATE OF STEEL OPERATIONS.

The rate at which the iron and steel industry is operating is a never ending riddle with a startling disparity in the guesses.

Bold assertions are made and in some instances an imposing array of figures are given to back up arguments, but it would be interesting to know the origin of the statistics.

One authority says the Steel Corporation is operating close to 90 per cent of capacity and the independents below 50 per cent, and the next day we run across statements elsewhere to the effect that the operations of the leading interest are about 75 per cent and those of the industry as a whole 25 per cent.

There are many men in the trade in close touch with the manufacturing end of the industry whose estimates come nearer to the latter figures and some put them even lower, and it is a foregone conclusion that more plants will shut down than resume in the near future.

As a whole the trade is optimistic and banking on a renewed activity and a buying movement to commence after the first of the year.

Some are so optimistic as to believe that another wave of prosperity is rolling up and will sweep the country in as full force as the one just now ebbing.

The most important development in the iron and steel industry during the past week was the acknowledgment by steel companies that wages would be reduced from 15 to 25 per cent beginning the first of the year.

This was foreseen some time ago when these companies commenced lowering their prices of finished steel products and finally came down to the same level as was established by the Industrial Board in March of last year.

At this level many of the independent mills were losing money and an adjustment in production costs became a necessity.

As the labor at these plants is for the most part paid according to an established sliding scale, the drop in prices operated automatically to reduce wages, but as the mills continued to pay at the higher rate the trade was in a quandary as to how long the higher rate was to be maintained.

During the past week officials of the Midvale Steel & Ordnance Company, the Lackawanna Steel Company and other independents announced a reduction in wages of from 15 to 25 per cent beginning the first of the year.

Announcement was made of a reduction from 46 to 38 cents an hour at four Ohio Valley plants of the Wheeling Steel Corporation, with elimination of extra pay for time over eight hours.

Judge E. H. Gary of the United States Steel Corporation declined to make any comment on wage re-

ductions, nor would he give any indication as to the policy of the corporation.

The open shop policy is maintained at most of the plants of the leading interest and wages are not paid on the sliding scale, and even if they were this interest still adheres to the former schedule of prices and is not confronted by the same adverse change in ratios of selling prices and production costs.

It is anticipated in many quarters, however, that the corporation will announce a cut in the not distant future.

Steel.

As a whole, steel prices are more satisfactory than in several weeks, but, broadly, so little attractive business is coming up that the market simply is drifting. The Iron Trade Review composite price average of the iron and steel market last week is \$53.57, against \$54.24 the preceding week, \$63.34 four weeks ago and the highest point of \$68.87 in August.

Wage reductions have touched the base of the steel industry, the Lake Superior iron ore fields.

One independent operator has put in effect a cut of 25 per cent and another one of 20 per cent.

Other companies are expected to follow this lead. There has been a further scaling down of both wage rates and salaries in equipment, automobile, shipbuilding and other industrial plants in various directions.

At the present time the steel market is the duller in many years. Reduction of prices by the independents to the Steel Corporation level has elicited no response from buyers, and mill after mill has shut down. The independent steel plants at Youngstown, Ohio, have closed down the main departments until the first of the year, affecting about 20,000 men.

Copper.

The dominant feature of the domestic copper industry last week was the cut in wages effective January 1, and which was announced at the mines and smelters of almost all the copper companies of the country.

The largest exception is the American Smelting and Refining Company which has made a wage cut of its East Helena, Montana, smelter only, but officials of the company are now making a trip of inspection to the different properties in order to decide as to how much of a cut will be made.

The copper market was growing somewhat softer last week, but the larger producers held firmly to 14 cents for December and January delivery and 14.25 cents for February and March.

Smaller interests were said to be willing to shade these prices, but there were no general offerings from second hands who practically closed out their stocks on the recent revival.

One interest representing South American interests and customs smelters is reported as bidding for busi-

ness at 13.50 and 13.75 cents for deliveries over the next 60 days.

At any event wire drawers and others have been forced into the market and a sale of 16,000,000 pounds was effected last week at better than 14 cents a pound for first quarter delivery.

It is reported that the present government of Mexico has removed the export duty on copper going into the United States until the price shall have reached 15 cents.

Wire and cable makers report their mills running at from 50 to 75 per cent of capacity.

Tin.

Both the domestic and London tin markets have been characterized by violent fluctuations.

A further decline has taken place in Chicago prices. Pig tin has gone down from 38 cents to 36¾ cents per pound and bar tin from 40 cents to 38¾ cents per pound.

Lead.

The domestic lead market held fairly firm until the end of the week, when it showed signs of softening.

The opening prices in the outside market were 4.85 for New York and 4.75 cents a pound for St. Louis, but by the close they had receded to 4.70 and 4.65 cents respectively.

The leading interest maintained its quotation of 5 cents for both places throughout the week.

Some 800 tons of base bullion were imported from Mexico, but no exports were recorded during the week.

Total exports so far this month aggregate 600 tons only.

The London market continued to decline during the week, but stiffened up some at the last.

With the recent declines in London another invasion of foreign lead hangs over the market and further reductions are anticipated to head this off.

A better inquiry was reported last week, but no real business developed in the domestic market.

American pig lead was reduced in the Chicago market from \$5.20 to \$4.95 per hundred pounds and bar lead from \$5.95 to \$5.70 per hundred pounds.

Solder.

No further changes have occurred in the Chicago solder market. Prices now in effect are as follows: Warranted 50-50, per 100 pounds, \$25.00; Commercial 45-55, per 100 pounds, \$23.00; and Plumbers', per 100 pounds, \$21.00.

Zinc.

No additional price declines have occurred in the Chicago zinc market. In general, the domestic market is firmer on account of an improved demand from galvanizers. There has been steady buying during the past few days though without any real rush of demand, and the inquiries at the present moment are numerous, strengthening the view that consumers' stocks are quite moderate.

Some producers were meeting last week's market in a limited way, and the tonnage of prompt shipment sold has lessened the desire shown for realization.

Buyers seem slow, however, in advancing limits,

with the recollection of the briefness of the last advance.

But at present the buying interest decidedly exceeds the selling, especially as whatever costs may be they are certainly below the present level even allowing for all the labor reductions that can yet be reckoned upon.

Sheets.

Pittsburgh reports indicate that buying of sheets has not been stimulated as the result of the action of most independents in reducing prices to the basis of the American Sheet and Tin Plate Company.

The leading interest, which recently reaffirmed its present prices for the first half, is allotting its tonnage to regular customers on account of having a large carryover which takes it practically through the first quarter, and also because of its shortage of steel.

It is believed that it will be a matter of only a short time until independents will have taken good sized commitments for the first half, although some consumers appear to be under the impression that lower prices may be obtained.

This, according to the makers, is improbable so far as the first half, is concerned.

Tin Plate.

Current demand for tin plate is extremely light and new business which is moving involves stock items mostly.

The latter figure now is quoted by both leading interest and independents on first half business and the former is allotting tonnages for that shipment and is committed for the first quarter.

It is likely contracts for the first half also will come to independents in good volume in the near future now that the market has more stability in view of the determination on the price of \$7. With this in mind independent makers have begun to test the market for sheet bars and it is reported are about to place tonnages for the latter at \$47, Pittsburgh, although certain interests tried without success so far to buy lots at \$42, Pittsburgh.

Old Metals.

Wholesale quotations in the Chicago district which should be considered as nominal are as follows: Old steel axles, \$20.00 to \$21.00; old iron axles, \$32.00 to \$33.00; steel springs, \$19.50 to \$20.00; No. 1 wrought iron, \$16.00 to \$16.50; No. 1 cast, \$18.00 to \$18.50; all per net tons. Prices for non-ferrous metals are quoted as follows, per pound: Light copper 8 cents; light brass, 5 cents; lead 3½ cents; zinc, 3½ cents; cast aluminum, 10 cents.

Pig Iron.

According to Rogers, Brown & Company, Cincinnati, Ohio, a better feeling prevails and the general trend is optimistic for the future and it is thought that when inventories are completed or right after the turn of the new year, a buying movement will set in for the first quarter and first half. Many foundries are now running on low stocks and a matter of a few weeks will force them into the market, at which time it is expected the buying will be more for the future than for spot needs.

Current Hardware and Metal Prices.

AMERICAN ARTISAN AND HARDWARE RECORD is the only publication containing Western Hardware and Metal prices corrected weekly.

The prices and discounts quoted on this and the following pages, are, for the most part, subject to change without notice. Owing to the unsettled conditions of the markets and the shortage of materials it is practically impossible for any manufacturer to guarantee his prices for any given length of time.

METALS	HARDWARE	Scratch.	BEVELS, TEE.
PIG IRON.	ADZES.	No. 1S, socket Handledper doz. 2 50	Stanley's Rosewood handle, new listNet
Northern Fdy. No. 2.....\$35 70	Carpenters'.	No. 344 Goodell- Pratt, list less.....35-40%	Stanley iron handle.....Net
Southgrn Fdy. No. 2.....44 67	PlumbsPer doz. \$29.00	No. 7 Stanley....." 2 25	BINDING CLOTH.
Lake Sup. Charcoal.....53 50	Coopers'.	AXES.	Zinced55%
Malleable35 70	Barton'sNet	First Quality, Single Bitted, 3 to 4 lb., per doz. 16 50	Brass40%
FIRST QUALITY BRIGHT TIN PLATES	White'sNet	First Quality, Double Bittedper doz. 22 50	Brass, plated60%
Per Box	Railroad.	Broad.	BITS.
IC 14x20...112 sheets \$13 10	PlumbsPer doz. 30.00	Plumbs. Can. Pat., 6-lb. 65 00	Jennings PatternNet
IX 14x20.....15 15	AMMUNITION.	Single Bitted (without handles).	Ford Car.....List plus 5%
IXX 14x20.....16 40	Shells, Loaded, Peters.	Plumbs, 4½-lb.19 50	Ford's Ship....." 5%
IXXX 14x20.....17 70	Loaded with Black Powder, 18%	Double Bitted (without handles).	Irwin35%
IXXXX 14x20.....19 00	Loaded with Smokeless Powder18%	Plumbs, 4½-lb.23 50	Russell Jennings.....plus 20%
IC 20x28.....26 20	Winchester.	BAGS, PAPER, NAIL.	Clark's Expansive33½%
IX 20x28.....30 30	Smokeless Repeater Grade, 15%	Pounds ... 10 16 20 25	Steer's "Small list, \$22 00..5%
IXX 20x28.....32 80	Smokeless Leader Grade...15%	Per 1,000..\$5 00 6 50 7 50 9 00	" "Large " \$26 00..5%
IXXX 20x28.....35 40	Black Powder15%	BALANCES, SPRING.	Irwin Car.....35%
IXXXX 20x28.....38 00	U. M. C.	Sight Spring.....Net	Ford's Ship Auger pattern CarList plus 5%
COKE PLATES	Nitro Club.....18%	StraightNet	Center10%
Cokes, 180 lbs.... 20x28 \$17 80	Arrow18%	BARS, WRECKING	Countersink.
Cokes, 200 lbs.... 20x28 18 00	New Club.....18%	V. & B. No. 12.....\$0.45	No. 18 Wheeler's...per doz. \$2 25
Cokes, 214 lbs....IC 20x28 18 30	Gun Wads—per 1000.	V. & B. No. 24.....0.75	No. 20 " " " 3 00
Cokes, 270 lbs....IX 20x28 20 30	Winchester 7-8 gauge 10&7½%	V. & B. No. 324.....0.80	American Snailhead " 1 75
BLUE ANNEALED SHEETS.	" 9-10 gauge 10&7½%	V. & B. No. 30.....0.85	" Rose... " 2 00
Baseper 100 lbs \$4 68	" 11-28 gauge 10&7½%	V. & B. No. 330.....0.90	" Flat... " 1 40
ONE PASS COLD ROLLED BLACK.	Powder.	BASKETS.	Mahew's Flat... " 1 60
No 18-20.....per 100 lbs \$5 80	Each	Clothes.	" Snail.... " 1 90
No. 22-24.....per 100 lbs. 5 85	DuPont's Sporting, kegs..\$11 25	Small Willow...per doz. 15 00	Dowel.
No. 26.....per 100 lbs. 5 90	" " ¼ kegs 3 10	Medium Willow.. " 17 00	Russel Jennings.....plus 20%
No. 27.....per 100 lbs. 5 95	DuPont's Canisters, 1-lb.. 55	Large Willow.... " 20 00	Gimlet.
No. 28.....per 100 lbs 6 00	" " kegs.. 22 00	Galvanized. 1 bu. 1½ bu.	Standard Double Cut Gross \$5 40
No. 29.....per 100 lbs. 6 10	" " ¼ kegs... 5 75	Per doz.....\$16 08 \$18 72	Nail Metal Single CutGross \$4 00—\$5 00
GALVANIZED.	" " canisters 1 00	BEATERS.	Reamer.
No. 16.....per 100 lbs. \$6 60	Hercules "E.C", kegs.....22 60	Carpet. Per doz.	Standard Square.....Dex 2 50
No. 18-20.....per 100 lbs. 6 75	Hercules "Infallible", 25-can drums22 00	No. 7 Tinned Spring Wire..\$1 10	American Octagon... " 2 50
No. 22-24.....per 100 lbs. 6 90	Hercules "Infallible", 10 can drums9 00	No. 8 Spring Wire Cop- pered1 50	Screw Driver.
No. 26.....per 100 lbs. 7 05	Hercules W. A. 30 Cal. Rifle, canisters1 25	No. 9 Preston.....1 75	No. 1 Common.....40
No. 27.....per 100 lbs. 7 20	Hercules Sharpshooter Rifle, canisters1 25	Egg. Per doz.	No. 26 Stanley.....75
No. 28.....per 100 lbs. 7 35	Hercules Bullseye Revolver, canisters1 00	No. 50 Imp. Dover.....\$1 10	BLADES, SAW.
No. 30.....per 100 lbs. 7 85	ANVILS	No. 102 " " Tinned 1 35	Wood.
BAR SOLDER	Solid Wrought....23 & 23½ per lb.	No. 150 " " hotel 2 10	Diaston 30-in.
Warranted,	ASBESTOS.	No. 10 Heavy hotel tinned 2 10	No.6 66 26
50-50per 100 lbs. \$25 00	Paper up to 1/16.....10c per lb.	No. 13 " " " 3 30	\$9 45 \$10 05 \$9 45
Commercial,	Millboard 3/32 to ¼..10½c per lb.	No. 15 " " " 3 60	BLOCKS.
45-55per 100 lbs. 23 00	Corrugated Paper, (250 sq. ft.).....\$6.50 per 100 lbs.	No. 18 " " " 4 50	Wooden20%
Plumbers'per 100 lbs. 21 00	Rollboard11c per lb.	Hand. 8 9 10 12	Patent20%
ZINC.	AUGERS.	Per doz.\$11 50 13 00 14 75 18 00	BOARDS.
In slabs\$6 35	Boring Machine40 @ 40&10%	Moulders'.	Per doz.
SHEET ZINC.	Carpenter's Nut.....50%	12-inchPer doz. 20 00	24x2413 60
Cask lots13c	Hollow.	BELLS.	26x2616 05
Less than cask lots....13¼-13½c	Bonney'sper doz. 30 00	Call.	28x2818 85
COPPER.	Post Hole.	3-inch Nickered Rotary Bell, Bronzed base....per doz. \$5 50	30x3021 30
Copper Sheet, mill base....22½c	Iwan's Post Hole and Well...30%	Cow.	33x3325 50
LEAD.	Vaughan's, 4 to 9 in.per doz. \$14.00	Kentucky30%	36x3630 50
American Pig\$4 95	Ship.	Door. Per doz.	Wash.
Bar5 70	Ford'sNet	New Departure Automatic \$7 50	No. 760, Banner Globe, (single)per doz. \$5 25
Sheet.	AWLS.	Rotary.	No. 652, Banner Globe, (single)per doz. 6 75
Full coilsper 100 lbs. \$8 50	Brad.	3 -in. Old Copper Bell... 6 00	No. 801, Brass King per doz. 8 25
Cut coilsper 100 lbs. 8 75	No. 3 Handled...per doz. \$0.65	3 -in. Old Copper Bell, fancy8 00	No. 860, Single—Plain Pump6 25
TIN.	No. 1050 Handled " 1 40	3 -in. Nickered Steel Bell 6 00	BOLTS.
Pig tin36½c	Patent asst'd, 1 to 4 " 85	3½-in. Nickered Steel Bell 6 50	Carriage, Machine, etc.
Bar tin38½c	Harness.	Hand.	Carriage, cut thread, ¾x6 and sizes smaller and shorter40 & 10%
	Common1 05	Hand Bell polished List plus 15%	Carriage, sizes larger and longer than ¾x6.....+15%
	Patent1 00	White Metal....." 15%	Machine, ¾x4 and sizes smaller and shorter.....50%
	Peg.	Nickel Plated....." 5%	Machine, sizes larger and longer than ¾x4.....40%
	Shouldered1 60	Swiss10%	Stove5-10%
	Patented75	Miscellaneous.	Tire40-5%
		Church and School, steel alloys30%	Hortise, Door.
		Farm, lbs...40 50 75 100	Gem, iron.....5%
		Each ...\$3 00 3 75 5 50 7 25	Gem, bronze plated.....5%

Barrel. CastNet Wrought Wrought, bronzed	CEMENT, FURNACE. American Seal, 5 lb. cans, net \$9 45 " " 10 lb. cans, " 90 " " 25 lb. cans, " 1 87 Asbestos, 5 lb. cans, " 45 Pecora, 5 lb. cans, " 45 " 10 lb. cans, " 90 " 25 lb. cans, " 1 87	Quilt Frame. No. 30 Ball and Socket, 2 1/2" head....per gross \$13 00 No. 50 Ball and Socket, 3 1/2" head....per gross 14 50	DIGGERS. Post Hole. Eureka.....per doz. \$14 50 Iwan's Split Handle (Eu- reka) 4-ft. Handle...per doz. 15 00 7-ft. " ..per doz. 20 00 Iwan's Hercules pattern per doz. 18 00 Dividers, Wing25%
Flush. Wrought Spring. Wrought Wrought, heavy	CEMENT ASBESTOS Per bag\$3 00	Hose. Sherman's, brass, 1/2", per doz.\$0.48 Double, brass, 1/2", per doz. 1 20	DRILLS. Blacksmith's Twist. (New List)40%
Square. Wrought	CHAINS. Breast Chains. With Slide.....doz. pairs, 5 50 Without Slide.. " 5 06 Doubleslack.... " 9 35 With Covert Snaps " 6 38	Saw Filers. Wentworth's, No. 1, \$12.50; No. 2, \$18.25; No. 3, \$16.25.	Hand. Goodell's Automatic. Nos. 01 03 Per doz. 12 00 14 40 Goodell's Single Gear, per doz.15 76 Goodell-Pratt No. 4 1/2, per doz. list, less.....30% Goodell-Pratt No. 379, per doz. list, less.....30%
BOXES. Mail. No.... 2 4 10 Per doz...\$18 00 23 00 29 00	Picture Chains. Light Brass, 3 ft. per doz. \$1 25 Heavy Brass, 3 ft. " 1 75	CLAWS, TACK.. Wood hdl. No. 10...per doz. \$0 95 Forged steel, wood hdl. " 1 75 Solid steel..... " 2 40 Giant " 50	Reciprocating. Goodell's.....per doz. 26 00
Mitre. Stanley'sNet Prices Stearns, No. 2...per doz. \$48 00	Sash Chain. (Morton's) Steel, per 100 ft. 0\$2 50 23 10 13 60	CLEANERS. Drain. Iwan's Adjustable.....25% Iwan's Stationary.....30%	DRIVERS, SCREW. StandardNets Lock Ferrule Clark's Interchangeable ... Goodell's Spiral Yankee Ratchet " Spiral
BRACES, RATCHET. Goodell-Pratt No. 408\$4 60 " " No. 4104 80 " " No. 4125 00 V. & B. No. 444 8 in.....\$4.65 V. & B. No. 333 8 in.....4 30 V. & B. No. 222 8 in.....4 00 V. & B. No. 111 8 in.....3 50 V. & B. No. 11 8 in.....3 05	Champion Metal. 0R5 40 2R5 60 1R7 75 Champion Metal.—Extra Heavy. 1H9 50	Pot. Wireper doz. \$0 75	ELBOWS—Stove Pipe. 1-piece Corrugated, Uniform Dox. 5-inch\$2 25 6-inch2 30 7-inch2 60
BURRS, RIVETING. Copper Burrs only..25% above list Tinners' Iron Burrs only....30%	Cable Sash Chains. Steel.....List Net Plus 15%	CLEAVERS. Family. Beatty's, inch..... 7 8 9 10 Per doz. \$27 00 29 00 33 00 36 00	CLIPS. Bolt\$2 25& 60
BUTTS. Cast Iron7 1/2% Wrought Bronze, No. 175 AC 2 1/2\$1 75 Steel, Bright, Narrow 15-7 1/2-5% Steel, Japanned, NarrowList+65%	CHALK, CARPENTERS'. Blueper gro. \$1 40 Red1 40 White1 25 Common White School Crayon25c	CLEAVISES. Malleable10c lb.	CLIPPERS. Bolt\$2 25& 60
CALIPERS. DoubleNet Inside and Outside..... Wing	CHIMNEY TOPS. In bagsper bag \$1 70	CLIPS. Axle65&5%	CORD. Picture. White Wire60&5%
CALKS. Toe. Blunt and medium, 1 prong per 100 lbs.....\$6 20 Sharp, 1 prong, per 100 lbs. 6 70	CHECKS, DOOR. CorbinNet List Russwin20%	COLLARS, STOVE PIPE. Lacquered. Inches 5 6 7 Fancy pattern, per doz.... 80c 85c \$1 15	ENAMEL, STOVE. Iron, Black. Per Gross Peerless Gloss, 1/4 pt.....\$16 20 " " 1/2 pt.....21 00 Per doz. " " 1/4 gal.....\$12 00 " " 1 gal.....21 00
CANS. Ohio. Gals..... 5 8 10 Each\$3 65 \$4 45 \$4 70 Gem. Gals..... 5 8 10 Each\$3 85 \$4 95 \$5 20 Jersey or Holstein. Gals..... 5 8 10 Each\$4 15 \$5 60 \$5 90	CHISELS. Cold. Good quality, 1/4 in., each \$0 49 " " 1/2 in. " 0 32 Diamond Point. V. & B. No. 15, 1/4 in.....0 37 V. & B. No. 15, 1/2 in.....0 60	COMPASSES. Carpenters'15%	ELBOWS—Conductor Pipe. Galvanized Steel, Tin and Terne. Round Corrugated. Size. Doz. 3-inch50% 3-inch50% 4-inch50% 5-inch50% 6-inch50%
CAN OPENERS. See Openers.	FIRMER BEVELLED. Berg's (Swedish). 1/2-inch, per doz.....\$ 4 45 1- " " 7 15 1 1/2- " " 10 15 2- " " 17 15 2 1/2- " " 26 95	COPPERS—Soldering. Pointed Roofing. 3 lb and heavier....per lb. 37c 2 lb. " " 38c 2 1/2 lb. " " 37c 1 1/2 lb. " " 40c 1 lb. " " 43c	EMERY. Domestic, lb.11 1/2c
CAPS, GUN. See Ammunition.	ROUND NOSE. V. & B. No. 65, 1/4 in.....0 37 V. & B. No. 65, 1/2 in.....0 49	COTTERS, SPRING All sizes37 1/2%	EYES. Bright Wire Screw—See Woods. B. W. Drifting Pick60, 10 & 5%
CARRIERS. Hay. Diamond, Regular...each, Nets Diamond, Sling.... " "	SOCKET FIRMER. Berg's (Swedish). 1/2-inch, per doz.....\$11 95 1- " " 16 75 1 1/2- " " 23 95 2- " " 35 95	COUPLINGS, HOSE. Brassper doz. \$2 20	FASTENERS, STORM SASH. Shroeder'sper doz. \$1 50 Sensible " 3 00
CARTRIDGES. See Ammunition.	CAPE. V. & B. No. 50, 1/4 in.....0 29 V. & B. No. 50, 1/2 in.....0 71	CRADLES, GRAIN. Morgan's Grapevine per doz. \$45 1/2	FILES AND RASPS. Simonds'50% Dunston's50% Keller's (American).....50&10% Swiss5% Horse75%
CASTERS. Standard—Ball Bearing,50&10% Bed40% Common Plate. Brass Wheel15% Iron and porcelain wheels, new list50% Philadelphia Plate, new list50% Martin's40%	CHUCKS, DRILL. Goodell's, for Goodell's Screw DriversList less 35-40% Yankee, for Yankee Screw Drivers\$6 00	CUTTERS Glass. Woodward40% Meat. Enterprise—Nos. 5 10 12 Each.... \$2 50 \$4 25 \$3 71 " Nos. 22 32 " 6 50 8 50	FIRE POTS. Clayton & Lambert's— each\$4 00 @ \$6 00 Gate Cityeach, 6 25 Gemeach, \$6 75 @ \$ 8 50
CATCHERS, GRASS. No. 160S, per doz.....\$12 25 No. 165S, "14 01	CHURNS. Anti-Bent Wood, Gal5 7 10 Each\$3 00 4 60 4 85 Belle, Barrel65&7 1/2% Common Dash, Gal5 7 Per doz.\$17 00 19 00	PIPE. Saunders', No. 1 2 3 Each\$1 85 2 75 6 71	
	CLAMPS. Adjustable. Martin's30% No. 63, Screw.....20% Cabinet. Screw20% Carpenters'. Steel Bar...List price plus 25% Carriage Makers'. 2 1/2".....per doz. 7 00 5"14 00 8"28 00 12"46 00	Slaw and Kraut. Per doz. 4-knife Kraut.....\$20 00-55 00 3-knife Kraut, 8x27 in.13 00-18 00 1-knife Slaw.....2 50 2-knife Slaw3 00 Washer11 00	
		DAMPERS, STOVE PIPE. Diamond. All sizes40%	

MANURE. 4-time New prices	FORKS. Coal Pick 40% Drifting Pick 40% File, assorted, 30c; Large, 35c per doz.	HOOKE. Awning, No. 60.....per gro. 50% Belt. Brown's 70&5% Jones' 65&5%	KNIVES. Beet Topping. Clyde, 9-in. Solmiter Blade, doz. \$2 85 California 2 40
GAUGES. Cream Fall. Fairmount.....per doz. \$3 75 Marking, Mortise, etc..... Nets	Hammer. Adze Eye ..per doz. 40c to \$1 00 Blacksmiths' " 45c@1 00 Machinists' " 50c@1 00	Box. No..... 9 10 12 Each 0 35 0 85 0 40	Butcher, Per doz. Beechwood Handles, 6" blade \$4 00 Beechwood Handles, 7" blade 4 65 Beechwood Handles, 8" blade 5 65
Wire. Diastion's 25%	Hay and Manure Fork.....25% Screw Driver. Assorted 6 Large 9	Bush. Common Axe Handle, per doz. \$22 00	Cooper's Hoop15% Corn. Clipperper doz. \$1 75 Diastion's " 2 75 Earle's " 3 00 Woodford " 3 25
GIMLETS. Discount 35@40%	Shovel and Spade.....25% HANGERS. Barn Door. U. S. Roller Bearing.....12 1/2% Matchless12 1/2% Warehouse Tandem, No. 4433 1/2%	Chain. Inch. 3/4&5/16 7/16 1/2 Pr 100 \$7 60-8 10 9 75 11 50 13 60	Drawing. StandardList&5% Adjustable15% Barton's Carpenters'.....15%
GLUE. Bulk. B Amber.....per lb. 35c A White..... " 40c H. S. Amber..... " 32c	Conductor P. Iwan's Perfection.....45% Eaves Trough. All sizes, 5" or smaller, per gross \$3 30 Net All sizes, larger than 5"per gross 5 00 "	Clothes Line. Japannedper doz. 48c@1 40 Galvanized..... " 75c@2 50	Hay. Iwan's Solid Socket..doz. 13 00 Heath's " 12 00 Iwan's, Sickle Edge.. " 18 00 Iwan's Imp'd Serrated " 18 00
Liquid. Army & Navy.....40% Le Page's..... List "A".....37 1/2% List "B".....33 1/2% List "C".....25 %	Garage Door. Right Angle50&10% Sliding Folding50% Receding50%	Coat and Hat. Common Wire per gro. 1 25-1 65	Hedge. Challengeper doz. \$6 00 Diastion's " 8 75
GREASE, AXLE. Wood Boxes. Frazer'sper gro. \$13 00 Hub Lightning 7 50	Parlor Door. Acmeper set, \$3 75 Ives' Improved..... " 3 40 Lane's Standard... " 3 50 Lane's New Model " 3 10 Le Roy Noiseless.....40&10% Richards25% Advance40&10%	Conductor. Iwan's Tinned Sickle.....List	Mining. Common, Single .. " 60 Common, Double.. " 30 Streeter, 4-blade.. " 1 30 Streeter, 6-blade.. " 2 00
Wood Falls. Frazer's, 15 lb. \$1.00; 25 lb. \$1.50 each. Hub Lightning, 15 lb. 90c; 25 lb. \$1.21 each.	Parlor Door. Acmeper set, \$3 75 Ives' Improved..... " 3 40 Lane's Standard... " 3 50 Lane's New Model " 3 10 Le Roy Noiseless.....40&10% Richards25% Advance40&10%	Corn. Common, riveted, red, per dz. Net Little Giant..... " "	Putty. Commonper doz. \$9 75@1 50 Landers " 1 75@2 50
Tin Cans. Frazer's 1 1/2 lb. per doz.....\$1 75 3 lb. per doz..... 2 25	Grindstones. Family. Inches.. 7 8 10 12 Per doz. 20 50 21 75 26 25 30 50	Grass. Common Nos. 1 3 5 7 Per Doz..\$4 50 3 50 3 75 3 25	Scrapping. Beech Handle 90@1 10 Landers 5 50@6 50
Mounted. Ball Bearing.. 1 2 3 Each\$4 75 5 00 5 25	Grindstones. Family. Inches.. 7 8 10 12 Per doz. 20 50 21 75 26 25 30 50	Hammock. With plate.....per doz. 1 10 With screw..... " 1 00	Door. Mineralper doz. \$1 30 Porcelain " 1 30 Jet " 3 00
GUNS. Iver Johnson Champion Single Barrel Shot Guns.....Net Double Barrel, Hammerless "	Grindstones. Family. Inches.. 7 8 10 12 Per doz. 20 50 21 75 26 25 30 50	Picture.50%&50&10% Potato and Manure.....Nets	Grading. Common, Single .. " 60 Common, Double.. " 30 Streeter, 4-blade.. " 1 30 Streeter, 6-blade.. " 2 00
HAFTS, AWL. Brad. Commonper doz. \$0 25	Grindstones. Family. Inches.. 7 8 10 12 Per doz. 20 50 21 75 26 25 30 50	Picture.50%&50&10% Potato and Manure.....Nets	Grading. Common, Single .. " 60 Common, Double.. " 30 Streeter, 4-blade.. " 1 30 Streeter, 6-blade.. " 2 00
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GUNS. Iver Johnson Champion Single Barrel Shot Guns.....Net Double Barrel, Hammerless "	Grindstones. Family. Inches.. 7 8 10 12 Per doz. 20 50 21 75 26 25 30 50	Picture.50%&50&10% Potato and Manure.....Nets	Grading. Common, Single .. " 60 Common, Double.. " 30 Streeter, 4-blade.. " 1 30 Streeter, 6-blade.. " 2 00

LINING, STOVE.

Bricksper crate 42c

LOCKSBarn Door.
No. 60 Stearns...per doz. \$12 00
No. 80 " " " 24 00**MACHINES.**Riveting.
Stearns No. 1...per doz. \$14 00
Tensioning.
No. 50 Peace's Spoke, each \$16 00**MAIL BOXES.**

See Boxes.

MALLETS.Carpenters'.
Fibre Head, No. 2 per doz. \$16 50
" No. 3 " 19 50
" No. 4 " 23 50
Round Hickory
.....per doz. \$3 00—5 00
Round Lig-
numvitae.. " 25—10 50
Square Hickory " 3 50—5 50
Square Lig-
numvitae.. " 3 00—12 00Tinners'.
Hickoryper doz. \$2 25**MATS.**Door.
National Rigid5&10&5%
Acme Steel Flexible.....50%Stove.
No. 2.....per gro. Nets
No. 1....." "
No. 1 Asbestos Toasters or
wire-covered Stove Mats,
with handle.....per doz. 1 10
No. 2 Asbestos Toasters,
with ring.....per doz. 60**MATTOCKS.**

Plumbs25%

MAULS.Wood Choppers'.
Lake Superior & Oregon
pat.40&5%**MEASURES.**Galvanized, doz.Nets
Japanned, doz.Nets**MILLS, COFFEE.**Enterprise16%
Parker50&5%
Arcade40-10%**MITRE BOXES.**

See Boxes.

MOPS.Cotton, Star (Cut Ends).
Pounds 12' 15' 18' 24'-3 oz.
Per doz. \$4 50 5 55 6 75 9 00**NAILS**Cut Steel.....\$4 45
Cut Iron4 45Wire.
Common4 45Cement Coated.
Small Lots4 20Horseshoe.
Ausable55&5%
Capewell15%
Perfect55&5%
Putnam20&5%
Star30&5%Picture.
Brass Heads25%Brads50&5%
FurnitureList plus 15%**NAIL PULLERS.**

See Pullers.

NAIL SETS.

See Sets.

NETTING, POULTRY.Galvanized before weaving...50%
Galvanized after weaving...40%**NIPPERS.**End Cutting.
Berg's (Swedish) In. 5 6
Per dozen\$12 60 15 20End and Diagonal Cutting.
Berg's (Swedish) In. 5 6
Per dozen\$10 05 13 00Hoof.
Heller's40&10%
V. & B., No. 52, each...\$2 25**NOZZLES.**Hose.
Magicper doz. \$9 50
Diamond5 75**NUTS, HOT PRESSED.**Squar Tapped.
\$1 85 off per 100 lbs.
Hexagon Tapped.
\$1.85 off per 100 lbs.**OILERS.**Chase Pattern.
Brass and Copper.....10%
Zinc20%Railroad.
Coppered33&4%Steel.
Copper Plated50-10-5%**OPENERS.**Can.
Delmonicoper doz. \$1 20
Never Slip.....65Crate.
V. & B.....per doz. \$7 25-11 00**OUTFITS, COBBLING.**Combinationper doz. \$16 00
Economy8 50
Family " 14 50**PAIS.**Cream.
14-qt. without gauge,
.....per doz. \$9 50
18-qt. without gauge,
.....per doz. 11 00
20-qt. without gauge,
.....per doz. 11 75Sap.
10-qt., IC Tin.....per doz. \$4 00
12 " " " 5 50Stock.
Galv. qts. 14 16 18 20
Per doz. \$9 75 10 75 12 75 14 50Water.
Galvanized qts. 10 12 14
Per doz.\$5 75 6 50 7 25Wood.
Cable, 2-Hoop.....per doz. Nets
Cable, 3-Hoop....." Nets
Cedar, 3-Hoop, brass " Nets**PANS.**DrippingNet
Fry.
CommonNets
AcmeRoasting.
Paxton,
No.1 2 3 4
Per doz.Nets
Neverburn

Savory, No. 200..per doz. \$3 40

PAPER.Roofing. per square
Major, 1-ply\$1 83
" 2-ply2 24
" 3-ply2 65
Red Rosin.....per ton \$111 45Sand and Emery.
No. 1, per ream, best grade \$5 40
No. 1, per ream, cheaper
grade4 85**PARERS.**Apple.
Goodell'sper doz. \$10 80
Turntable11 40
White Mountain " 8 40
Reading No. 78 " 11 40Potato.
Goodell's Saratoga, 10 1/2
in., doz.6 50
Goodell's Saratoga, 5 in.,
doz.5 50**PICKS.**Adze Eye Ore.....23 1/2%
Drifting and Poll Picks.....23 1/2%
Plumbs, Railroad23 1/2%
Surface23 1/2%**PINCERS.**Carpenters', cast steel,
No.4 8 10 12
Each\$0 63 .80 1 05 1 15
Blacksmiths', No. 101 07
Heller'sList plus 10%**PINS.**Clothes.
Common, per box of 5 gro. \$0 90Picket.
Fluter, 15-in.....per doz. \$1 10
Fluted, 21-in....." 1 40
Spiral1 90**PIPE.**Conductor.
Plain Round and Round Corru-
gated.29 Gauge55%
28 "45%
26 "35%
24 "10%Square Corrugated A and B and
Octagon.29 Gauge45%
28 "40%
26 "30%
24 "10%Galvanized Toncan Metal, Genu-
ine O. H. Iron, Lyonore Metal,
Charcoal Iron and Keystone
C. B.Plain Round and Round Corru-
gated.28 Gauge45%
26 "35%
24 "10%Square Corrugated A and B Pol-
ygon and Octagon.28 Gauge40%
26 "30%
24 "10%14 and 16-oz. Copper, all de-
signs10%**PORTICO ELBOWS.**Galvanized and Terne Steel.
1 -inch35%
1 1/4-inch35%
1 1/2-inch35%
2 -inch35%Discounts on Round apply on
sizes 2-inch to 6-inch, inclusive.
Freight allowed on 15 dozen or
more, to all points where
freight rate does not exceed
\$1.00 per 100 lbs. Less than
15 dozen F. O. B. Factory.Terms 30 days net, 3% ten days.
Standard Gauge Conductor Pipe,
plain or corrugated.

Not Nested50%

Nested solid50 & 5%

STOVE29 Gauge, 3-inch.....\$19 00
" 4-inch.....19 50
" 5-inch.....20 25
" 6-inch.....21 00
" 7-inch.....22 00T-Joint Made up.
6-inchper 100 \$60 00**FURNACE PIPE.**Double Wall Pipe and Fit-
tings30%

Single Wall Pipe, Round

Pipe Fittings30%

Galvanized and Black Iron

Pipe, Shoes, etc.....30%

PLANES.

Stanley Iron Bench.....Net

PLATE, TIN.

See Metals in Column 1.

PLIERS.V. & B. No. 8each 6 64
" No. 7 Gas6 67
" Double Duty 106.....6 63
" Nut, No. 2.....6 70**Lineman's Side Cutting.**Berg's
(Swedish). In. 6 7 8
Blk. Pol. Face,
doz.\$16 70 20 00 23 25**Long Nose Side Cutting.**Berg's (Swedish) In. 5 6
Blk. Pol. Face, doz. \$12 25 15 20**Flat and Round Nose.**Berg's (Swedish)
Flat, In. 4 6 8
Blk. Pol. Face.

Dox.\$8 90 13 25 19 65

Berg's (Swedish)

Round, In. 4 6 8

Blk. Pol. Face.

Dox.\$11 15 16 20 23 35

POINTERS, SPOKE.Stearns' No. 1....per doz. \$10 00
" No. 2...." 12 00**POKERS, STOVE.**

Wrt Steel, str't or bent,

.....per doz. \$0 75

Nickel Plated, coil han's " 1 10

POLISH.

Metal.

Wizard, 6 -oz.. per gross \$21 00

" 1/2-pt.. " " 24 00

" 1/2-gal. " " 12 00

" 1 -gal. " " 21 00

STOVE.

Per gross

Black Eagle Paste 5 -oz. \$19 20

" " 1/2-lb. 21 00

Black Eagle Liquid, 6-oz.

per gross16 20

Black Kid Paste, 5-oz.

per case19 20

Black Kid Paste, 1/2-lb.. 21 00

Black Jack Liquid, 1/2-pt.

per gross16 20

Black Kid Liquid, 1/2-pt.. 24 00

Black Jack Paste, No. 10

per gross16 20

PRESSES, FRUIT AND JELLY.

Enterprise Manufacturing Co. 25%

PRUNERS.

Daston's Poie...per doz. \$18 00

Water's Improved..per doz. 60%

PULLERS.

Cork.

Daisyeach \$3 10

Phoenix1 40

Quick and Easy.....2 70

NAIL.

Giantper doz. \$14 50

Never-Slip17 00

PULLEYS.

Awning-Jay'd10%

Clothes Line10%

HAY FORK.

Iron Wheel, 5-in..per doz. \$2 50

Wood Wheel, 6-in. " 3 65

Wood Wheel, 6-in.,

pass knot2 00

SAW.

CommonNet

Common-Sense, 2-in.Net

Empire Pattern, 2-in.....Net

IdealNet

SteelNet

PUMPS.**SPRAY.**

Midget Junior....per doz. \$3 75

New Minty6 00

Crescent6 50

PUNCHES.

Conductors.

No. 22per doz. \$3 00

Machineper lb. 25

SADDLERS'.

Common..per doz. 1 50 to 5 00

REVOLVING SPRING.

Stearns, No. 10...per doz. \$2 00

" No. 40....." 18 00

" No. 60...." 19 00

PUTTY. Strictly pure...per 100 lbs. \$6 00	SAWS. Band. Disston's 2-in. to 18-in. 10&5% " 1/4-in to 1 1/4-in...20&10%	SETS. Nail. Square head.....per doz. 1 84 Cup point, knurled " 1 78	SPRINKLERS, LAWN. Stearn's No. 1....per doz. \$11 50
RAIL. Barn Door. Matchless, 1-in..... 5c Matchless, 1 1/4-in..... 7c Storm King 5c Sliding Door. Bronzed wrought iron,per ft. 8 1/4c	Butchers'. Disston's No. 2, 14-in.... 18 20 " No. 2, 15-in.... 19 50 " No. 2, 22-in.... 20 85 " No. 7, 16-in.... 20 00 " No. 7, 20-in.... 21 35 " No. 7, 24-in.... 23 35 " No. 7, 28-in.... 26 00 Compass. Disston's No. 20 Jackson.. 4 80 " No. 40 Sampson 2 60 " No. 277, 10-in.. 6 70 " No. 9, 10-in.... 7 70 Cross-Cut. Disston's No. 289, 4-ft.... 3 50 " No. 289, 6-ft.... 6 85 " No. 289, 8-ft.... 11 85 Flooring. Disston's D19, 16-in..... 27 15 " D19, 20-in..... 34 35 Hand and Rip. Disston's No. 7, 30-in.... 38 50 " No. 7, 32-in.... 42 90 " No. 8, 16-in.... 21 35 " No. 8, 20-in.... 25 15 " No. 8, 24-in.... 29 60 " No. 8, 28-in.... 35 45 " No. 8, 30-in.... 39 90 KeystoneNew Nets Keyhole. Disston's No. 5..... 3 65 " No. 10..... 4 00 " No. 95..... 6 30 Miter Box. Disston's No. 4, 4x20-in.. 36 15 " No. 4, 5x22-in.. 43 25 " No. 4, 6x22-in.. 47 20 Patternmakers'. Disston's 7 1/2-in..... 12 05 Pruning. Disston's No. 20..... 20 30 Stairbuilders'. Disston's 6-in. 7 90 Wood. Disston's No. 111, 30-in.. 22 20 " No. 111, 32-in.. 23 75 " No. 47, 30-in.. 20 25 " No. 47, 32-in.. 20 80	Rivet. Farmers'per doz. 2 50 Tinners' 3-4 5 75 " 00-0 8 75 Saw. Aiken's Pattern...per doz. \$6 50 Disston's Monarch " 7 20 Disston's X-cut... " 13 50 Leach's " 80 Nash's Hand " 3 15 Nash's X-cut " 4 20 Stillman's Lever.. " 1 30 Stillman's X-cut .. " 2 50 Whiting P a t t e r n, No. 21..... " 7 50 Eccentric A n v i l, Hand No. 395, N. P. Morrill Pat- t e r n " 14 50 SHARPENERS, SKATE. Diamondper doz. \$1 60 Perfect 1 20 SHEARS. Per Doz. Nickel Plated, Straight, 6" \$12 90 " " " 7" 14 85 " " " 8" 16 30 Japanned, Straight 6" 11 00 " " " 7" 12 40 " " " 8" 13 80 SHEAVES, SLIDING DOOR. Common. Inches 3 4 5 Per set.....\$1 40 1 75 2 40 Hatfield's. Per set \$1 80 2 10 2 75 28 SHELLERS, CORN Unionper doz. \$6 75 SHIELDS. Expansion Bolt Shields.....60% Shoes. Conductor60%	SQUARES. Steel and Iron.....Net (Add for bluing, \$2.00 per doz. net) MitreNet Try " Try and Bevel..... " Try and Miter..... " Fox'sper doz. \$6 00 Winterbottom's10% SQUEEZERS, LEMON. Common Woodper doz. \$0 70 Porcelain Lined, Wood " 1 25 Boss, malleable iron " 1 20 Iron frame, porc'n bowl " 1 90 Iron frame, glass bowl " 2 35 Little Giant, tin'd iron " 4 00 Drum, japanned.... " 3 60 Drum, nickel plated " 4 50 STAPLES. Blind. Barbedper lb. 21@22c Butter, Tub..... " 16@19c Fence— Polishedper 100 lbs. \$5 45 Galvanized " 6 15 Netting. Galvanized.....per 100 lbs. 6 50 Wrought. Wrought Staples, Hasps and Staples, Hasps, Hooks and Staples, and Hooks and Staples50&10% Extra heavy35% STEELYARD. Discount 25%.
RAZORS—SAFETY. Gilletteper doz. \$45 00 Auto Strop 45 00 Gem 8 40 Gem (3 doz. lots) .. " 8 00 Ever Ready 8 40 Ever Ready (3 doz. lots) " 8 00 RAZOR STROPS Star (Honing)50% REGISTERS. Cast IronList Steel and Semi-Steel.....10% Baseboard10% Adjustable Ceiling Ventilators 10% REGISTER FACES. Japanned, Bronzed and Plated. 4x6 to 14x14.....10% 14x14 to 38x42.....25% REVOLVERS. Iver Johnson Safety Automatic HammerNet Hammerless " I. J. Model 199..... "	SAW FRAMES. Common, plain...per doz. \$1 50 Common, painted... " 2 10 SCISSORS. Star40% SCOOPS Hubbard Western Pattern Riveted. Size.. A B C D 1 \$16 75 16 00 15 25 14 45 4 \$17 85 17 10 16 35 15 60 6 \$18 65 17 85 17 10 16 35 SCRAPERS. Box. Triangular, No. 6 per doz. \$6 25 Road. Cubic ft. 7 5 3 With runners, ea. \$7 00 6 50 6 20 SCREEN DOOR HINGES. Cast Irongross \$13 00 Steel " 9 50 SCREWS. Bench. Iron, ins. 1 1 1/4 1 1/4 \$6 82 \$7 87 9 45 16 80 Wood, white maple, per doz. 6 00 Hand—Wood50% Hand Rail22% Jack20% Lag or Coach—all sizes, gimlet pointed45-50% Saw—Centennial, Nos. 1 2 3 4 Per doz.....47c 55c 75c 90c Wood. F. H. Bright.....67 1/2-20% F. H. Blued.....65-20% F. H. Jap'd.....65-20% F. H. Brass.....57 1/2-20% R. H. Brass.....35 1/2-20% SCYTHES. Clipper, Grass ...per doz. \$13 50 Honest Dutchman... " 13 00	SHOT—See Ammunition. SHOVELS AND SPADES. Coal. Hubbard's No. A B C D 1 \$16 00 15 10 14 45 13 70 2 16 35 15 60 14 85 14 10 3 16 75 16 00 16 25 14 45 4 17 10 16 35 16 60 14 85 Post Drain & Ditching. Hubbard's Size..... A B C 14"\$17 15 16 40 15 65 16" 17 50 16 75 16 00 18" 17 85 17 10 16 35 20" 18 20 17 45 16 70 22" 18 55 17 80 17 05 Snow. Hubbard Special, Long Handle\$10 00 D-Handle 11 00 Sidewalk Scraper..... 6 50 Alaska Steel D-Handleper doz. \$3 50 Long Handle " 3 00 SINKS. Cast Iron. Painted, 16x24.....Net Enameled, White, 16x24... " Wrought Steel. Painted, 16x24" SNAPS, HARNESS. Covered Spring.....Add 30% Judd's Pattern Add 33 1-6% to list SNATHS. Double Ring, Bush..per doz. \$9 75 Patent Loop, Bush.. " 10 00 Patent Loop, Grass.. " 8 75 SNIPS, TINNERS'. Clover Leaf.....40&10% National40&10% Star50% SPRINGS, DOOR Perfect. Nos. 2 3 4 5 6 7 Per doz..55c 60c 65c 75c 90c 1 00 Reliance. Light Medium Heavy Per doz...\$1 55 2 10 3 20 Torrey'sper doz. 1 65	STONES. Axe. Hindustanper lb. New Nets More Grit..... " " Washita " " Emery. No. 126.....per doz. New Nets Oil—Mounted. Arkansas Hard No. 7.....per doz. New Nets Arkansas Soft.. " " Washita No. " " 717 " " Oil—Unmounted. Arkansas Hard..per lb. New Nets Arkansas Soft.. " " Lilly White..... " " Queer Creek.... " " Washita " " Scythe. Black Diamond per gro. New Nets Crescent " " Green Mountain " " LaMolle " " Extra Quinne- bog " " Red End " " STOPS, BENCH. No. 10 Morrill pat- ternper doz. \$11 00 No. 11 Stearns pat- tern " 10 00 No. 15 Smith pattern " 7 00 STOPPERS, FLUE. Commonper doz. \$1 10 Gem, flat, No. 3.... " 1 00 Gem, No. 1..... " 1 10 STRAPS. Skateper doz. 85c&1 20 STRETCHERS. Carpet. Bullard'sper doz. \$3 90 Excelsior " 5 25 Malleable Iron.... " 70 Perfection " 6 30 King " 4 50 Wire. O. S. Elwood, No. 1 per doz. Nets O. S. Elwood, No. 2 " " SWIVELS Malleable Iron.....per lb. \$0 10 Wrought Steel.....per gro. 4 50 TACKS. Bill Posters' 6-oz., 25 lb. boxes. per lb.25c to 26 1/2c Upholsterers' 6-oz., 25-lb. boxes, per lb.15 1/2c

TAPES, MEASURING.

Asses' Skin.....List&40%

THERMOMETERS.

Tin Case.....per doz. 3uc@ \$ 1 25
 Wood Back... " \$2 00@ 12 00
 Glass " 12 00

TIES.

Bale.
 Single Loop, carload
 lots75&7%
 Single Loop, less than
 car lots70&15%

TOOLS, SAW.

Disston's Universal10%

TRAPS.

Game with Chains. Per doz.
 Victor No. 1.....\$2 01
 Oneida Jump No. 1.....2 75
 Newhouse No. 1.....5 62
 Mouse and Rat. Net per gross
 Out O'Sight Mouse.....\$8 00
 " " Rat15 00
 " " Mole100 00
 No. 44 Pocket Gopher.....20 00
 Victor Mouse2 00
 Hold Fast Mouse.....2 60
 Victor Rat11 00
 Hold Fast Rat.....11 00
 Official Rat13 50
 Wood Choker Mouse, 4
 Holes11 00

TROWELS.

Brick.
 Clover Leaf30%
 Brade's15&5%
 Disston's30%
 Rose'sNet
 Plasterers'.
 Clover Leaf40%
 Disston's25%
 W. & McP.Net

TRUCKS.

Bageach \$3 75
 Warehouse or store,
 No. 1, each.....\$24 50
 No. 2, "22 50

TUBS, WASH.

Standard, Wood. Ex.
 Nos. 3 2 1 large
 Per doz. \$9 50 11 25 12 75 15 50
 Galvanized.
 No. 1 2 3
 Per doz. ..13 75 15 95 18 60

TWINE.

-ply Cotton Wrapping.....\$.35
 4 " Extra Wrapping
 4 " Hvy. Wrapping
 4 " Wrapping on tubes
 3 " cones.....
 4 " "
 India Hemp, 1/2-lb. balls,
 No. 4 1/235c
 No. 635c
 No. 835c
 No. 12
 2-ply Jute, 1 1/2-lb. balls, lb.....49c
 Seins.
 Soft.....per lb.....Net
 Med. "
 Hard "
 Staging, 1/2-lb. ball, size 21 " 24 "
 " " " size 27 " 27 "
 Bagging, 1/2-lb. ball, size " " "
 3-ply "B" in hanks..... " " "
 4- " " " " " " " " " " "
 3- " " " " " " " " " " "
 3- " Silver Finish in hanks " " "

VISES.

No. 700, Hand, 4 1/2 5 5 1/2
 Inches \$11 15 13 00 14 85
 No. 701. In. 4 5 6
 Doz. \$11 15 13 00 16 70
 No. 1, Genuine Wentworth,
 Noiseless Saw...per doz. 15 00
 No. 2, Genuine Wentworth,
 Noiseless Saw...per doz. 22 50
 No. 3, Genuine Wentworth,
 Noiseless Saw...per doz. 20 00
 No. 500, All Steel Folding
 Sawper doz. 16 00

Glue Pots.

TinnedAdd 15% to list
 Enameled30%

WASHERS.

Standard O. G. cast iron, per
 lb.3 1/2c
 Wrought steel in 5-lb. boxes,
 per lb.:
 In 3/16 1/4 5/16 3/8 1/2
 18c 16c 15c 13c 12c
 % % % 1
 11 1/2c 11c 11c 11c

WEDGES.

Axper doz. Nets
 Gallingper lb. Nets
 Sawper lb. 8 1/2

WEANERS.

Calif.
 Fuller's, per doz. \$2 00 to \$2 50
 Tyler's Safety, per
 doz.1 25 to 2 40
 Carroll's, per doz. 3 00 to 3 75
 Hoosier, per doz.. 3 50 to 4 60
 Shaw Perfected.. 3 00 to 3 75

WEIGHTS.

Hitchingper lb. Nets
 Sash—f. o. b. Chicago.
 Ton lots, per ton.....\$73 00
 Smaller lots, per ton.....75 00

WHEEL BARROWS.

No. 4 Tubular Steel.....@\$10 25
 Common Tray or Stave
 Tray@ 5 00
 Angle leg, garden.....@ 8 00

WHEELS.

Carborundum50%
 Emery60%
 Well, Ins. 8 10 12
 Per doz.....\$5 50 7 25 8 50
 12-in. heavy holting,
 per doz.\$25 00

WIRE.

Brass.
 In collsNets
 In 1-lb. spools, new list...Nets
 Broom—Tinned..... Nets
 Copper.
 In collsNets
 1-lb. spools, new list.....Nets
 Fence—Smooth, Annealed Galv'd
 Nos. 6 to 9, less than
 car, per 100 lbs. \$4 35- \$4 95
 Hair—New list.....40 & 10%
 Picture—In colls..80% @ \$0 & 10%
 In 5-lb. spools....per lb.....26c

WRENCHES.

Coes Steel Handle, 6-inch.....30%
 " " " 8- "30%
 " " " 10- "30%
 " " " 12- "30%
 Coes Knife-Handle, 6- "30%
 " " " 8- "30%
 " " " 10- "30%
 " " " 12- "30%
 Coes All Patterns.....30%
 Bemis & Cal's:
 Adjustable S. 10%; Adjustable
 S Pipe, 10%; Briggs'
 pattern30%
 Combination Bright25%
 Steel Handle Nut.....30%
 Combination Black25&5%
 Merrick Pattern30%
 Knife Handle Pattern,
 No. 62, Screw Wrench, List
 plus30%
 No. 60, Steel Handle.....30%

WRINGERS.

No. 790, Guarantee, per doz. \$66 00
 No. 770, Bicycle... " 64 00
 No. 310, Kingston.. " 59 00
 No. 110 Brighton.. " 57 00
 No. 2 Old Reliable " 40 50
 No. 740, Bicycle... " 64 00
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 Niagara Machine & Tool Wks.,
 Buffalo, N. Y.

Brass and Copper. Hussey & Co., C. G., Pittsburgh, Pa.	Fence Gates. American Steel & Wire Co., Chicago, Ill. Pittsburgh Steel Co., Pittsburgh, Pa.	Heaters—Warm Air—Cont. Manny Heating Supply Co., Chicago, Ill. Marshall Furnace Co., Marshall, Mich. May-Fiebeger Furnace Co., Newark, Ohio Meyer Furnace Co., Peoria, Ill. Modern Way Furnace Co., Fort Wayne, Ind. Monitor Stove Co., Cincinnati, Ohio Monroe Fdy. & Furnace Co., Monroe, Mich. Peerless Foundry Co., Indianapolis, Ind. Premier Warm Air Heater Co., Dowagiac, Mich. Roesch Enamel Range Co., Belleville, Ill. Rxbolt Heater Co., Ashland, Ohio Scheible-Moncrief Heater Co., Cleveland, Ohio Schill Bros. Co., Crestline, Ohio Schwab & Sons Co., R. J., Milwaukee Wis. Standard Fdy. & Mfg. Co., De Kalb, Ill. Standard Furnace & Supply Co., Omaha, Neb. St. Louis Heating Co., St. Louis, Mo. Taplin Furnace Co., Grand Rapids, Mich. Tubular Heating & Ventilating Co., Philadelphia, Pa. Waterloo Register Co., Waterloo, Iowa Wise Furnace Co., Akron, Ohio	Motocycles. Johnson's Arms & Cycle Wks., Iver, Pittsburg, Mass.
Builders Hardware. Bullard & Gormley, Chicago, Ill.	Fencing Wire. Pittsburgh Steel Co., Pittsburgh, Pa.	Monitors—Stove. Hussey & Co., C. G., Pittsburgh, Pa.	Nails—Slatting. Hussey & Co., C. G., Pittsburgh, Pa.
Castings—Malleable. Fanner Mfg. Co., Cleveland, Ohio	Fenders. Meyers Mfg. Co., Fred J., Hamilton, Ohio	Nails—Wire. American Steel & Wire Co., Chicago, Ill. Pittsburgh Steel Co., Pittsburgh, Pa.	Nut Crackers. Enterprise Mfg. Co. of Pa., Philadelphia, Pa.
Ceilings—Metal. Burton Co., W. J., Detroit, Mich. Friedley-Voshardt Co., Chicago, Ill. Milwaukee Corrugating Co., Milwaukee, Wis.	Files. Disston & Sons, Inc., Henry, Philadelphia, Pa. Heller Bros. Co., Newark, N. J. Nicholson File Co., Providence, Rhode Island	Ornaments—Sheet Metal. Friedley-Voshardt Co., Chicago, Ill. Gerock Bros. Mfg. Co., St. Louis, Mo.	Parts—Auto. International Radiator Co., Chicago, Ill.
Cement—Asbestos. Asbestos Products Co., Chicago, Ill.	Flux—Aluminum. Roesch, Geo. E., Aurora, Ill.	Parts—Bicycles. Corbin Screw Corp., New Britain, Conn.	Parts—Tools. Corbin Screw Corp., New Britain, Conn.
Chain—Furnace. Corbin Screw Corporation, New Britain, Conn.	Freezers—Ice Cream. North Bros. Mfg. Co., Philadelphia, Pa.	Patterns—Stove. Cleveland Castings Pattern Co., Cleveland, Ohio Cope-Swift Co., Inc., Detroit, Mich. Quincy Pattern Co., Quincy, Ill. Vedder Pattern Works, Troy, N. Y.	Pipe and Fittings—Furnace. Central Heating Supply Co., Chicago, Ill. Excelsior Steel Furnace Co., Chicago, Ill. Henry Furnace & Fdy. Co., Cleveland, Ohio Howes Co., S. M., Boston, Mass. Lamneck Co., W. E., Columbus, Ohio Manny Heating Supply Co., Chicago, Indiana Meyer & Bro. Co., F., Peoria, Ill. Michigan Safety Furnace Pipe Co., Detroit, Mich. Standard Furnace & Supply Co., Omaha, Neb.
Chain—Sash. Parker Supply Co., New York, N. Y.	Furnace Rings. Independent Reg. & Mfg. Co., Cleveland, Ohio Walworth Run Fdy. Co., Cleveland, Ohio	Pipe—Tools. Corbin Screw Corp., New Britain, Conn.	Pipe and Fittings—Stove. Hemp & Co., St. Louis, Mo. Howes Co., S. M., Boston, Mass. Meyer & Bro. Co., F., Peoria, Ill. Sullivan-Geiger Co., Indianapolis, Ind.
Chaplets. Fanner Mfg. Co., Cleveland, Ohio	Grindstones. Richards-Wilcox Mfg. Co., Aurora, Ill.	Humidifiers. Haynes, Kansas City, Mo.	Patterns—Stove. Cleveland Castings Pattern Co., Cleveland, Ohio Cope-Swift Co., Inc., Detroit, Mich. Quincy Pattern Co., Quincy, Ill. Vedder Pattern Works, Troy, N. Y.
Chisels. Vaughan & Bushnell Mfg. Co., Chicago, Ill.	Guards—Fire. Meyers Mfg. Co., Fred J., Hamilton, Ohio	Indoor Closet. Independent Reg. & Mfg. Co., Cleveland, Ohio	Pipe—Conductor. Berger Bros. Co., Philadelphia, Pa. Burton Co., W. J., Detroit, Mich. Clark-Smith Hdw. Co., Peoria, Ill. Dieckmann Co., Ferdinand, Ind. Friedley-Voshardt Co., Chicago, Ill. Hussey & Co., C. G., Pittsburgh, Pa. Milwaukee Corrugating Co., Milwaukee, Wis.
Cleaners—Hand. Nickel Plate Stove Polish Co., Chicago, Ill.	Hammers. Vaughan & Bushnell Mfg. Co., Chicago, Ill.	Jobbers—Hardware. Bullard & Gormley Co., Chicago, Ill. Clark-Smith Hardware Co., Peoria, Ill.	Polish—Metal and Stove. Black Silk Stove Polish Co., Sterling, Ill. Nickel Plate Stove Polish Co., Chicago, Ill.
Cleasners—Hand. Waterloo Register Co., Waterloo, Iowa	Handles—Boiler. Berger Bros. Co., Philadelphia, Pa.	Kitchen Utensils. Lalanc & Grosjean Mfg. Co., Chicago, Ill.	Posts—Steel Fence. American Steel & Wire Co., Chicago, Ill.
Clips—Damper. Waterloo Register Co., Waterloo, Iowa	Hangers—Door. Richards-Wilcox Mfg. Co., Aurora, Ill.	Lath—Expanded Metal. Milwaukee Corrugating Co., Milwaukee, Wis.	Presses—Lard. Enterprise Mfg. Co. of Pa., Philadelphia, Pa.
Closet Cleaners. Coleman, Allan J., Chicago, Ill.	Hangers—Eaves Trough. Abbott Mfg. Co., Cleveland, Ohio	Machines—Crimping. Bertsch & Co., Cambridge City, Ind. Niagara Machine & Tool Works, Buffalo, N. Y.	Punches—Combination Bench and Hand. Parker Supply Co., New York, N. Y.
Coal Chutes. Peerless Foundry Co., Indianapolis, Ind.	Heaters—Gas. Germer Stove Co., Erie, Pa.	Machinery—Culvert. Bertsch & Co., Cambridge City, Ind.	Punches—Hand. Parker Supply Co., New York, N. Y.
Coasters. The Auto-Wheel Coaster Co., Inc., No. Tonawanda, N. Y.	Heaters—School Room. Hammond Heating Co., Cincinnati, Ohio Haynes-Langenberg Mfg. Co., St. Louis, Mo. Hero Furnace Co., Chicago, Ill. Meyer Furnace Co., Peoria, Ill. Monroe Fdy. & Furnace Co., Monroe, Mich. Peerless Foundry Co., Indianapolis, Ind. Standard Furnace & Supply Co., Omaha, Neb.	Machines—Razor Blades. Hyfield Mfg. Co., New York, N. Y.	
Consumers—Gas and Soot. Z. T. Soot & Gas Consumer Co., Oshkosh, Wis.	Heaters—Warm Air. A-B Stove Co., Battle Creek, Mich. American Furnace Co., St. Louis, Mo. Black Diamond Furnace Co., Monmouth, Ill. Central Heating Supply Co., Chicago, Ill. Cooperative Foundry Co., Rochester, New York Danville Stove & Mfg. Co., Danville, Pa. Excelsior Steel Furnace Co., Chicago, Ill. Farris Furnace Co., Springfield, Mass. Forest City Fdy. & Mfg. Co., Cleveland, Ohio Germer Stove Co., Erie, Pa. Haynes-Langenberg Mfg. Co., St. Louis, Mo. Hall-Neal Furnace Co., Indianapolis, Ind. Hammond Heating Co., Cincinnati, Ohio Henry Furnace & Fdy. Co., Cleveland, Ohio Hero Furnace Co., Chicago, Ill. Hess-Snyder Co., Massillon, Ohio Lennox Furnace Co., Marshalltown, Iowa Magee Furnace Co., Boston, Mass. Mahoning Fdy. Co., Youngstown, Ohio	Machines—Stove Pipe. Hemp & Co., St. Louis, Mo.	
Cores—Radiator. Curfman Mfg. Co., F. L., Maryville, Mo. International Radiator Co., Chicago, Ill.	Hangers—Eaves Trough. Abbott Mfg. Co., Cleveland, Ohio	Machines—Tin Smiths. Bertsch & Co., Cambridge City, Ind. Dreis & Krump Mfg. Co., Chicago, Ill. Hemp & Co., St. Louis, Mo. Marshalltown Mfg. Co., Marshalltown, Iowa Niagara Machine & Tool Works, Buffalo, N. Y. Whitney Mfg. Co., W. A., Rockford, Ill.	
Cornices. Burton Co., W. J., Detroit, Mich. Friedley-Voshardt Co., Chicago, Ill. Milwaukee Corrugating Co., Milwaukee, Wis.	Heaters—Gas. Germer Stove Co., Erie, Pa.	Mailing Lists. Ross-Gould, St. Louis, Mo.	
Orbs and Bins. Thomas & Armstrong Mfg. Co., London, Ohio	Heaters—School Room. Hammond Heating Co., Cincinnati, Ohio Haynes-Langenberg Mfg. Co., St. Louis, Mo. Hero Furnace Co., Chicago, Ill. Meyer Furnace Co., Peoria, Ill. Monroe Fdy. & Furnace Co., Monroe, Mich. Peerless Foundry Co., Indianapolis, Ind. Standard Furnace & Supply Co., Omaha, Neb.	Ment Smokers. Chatsworth Mfg. Co., Chatsworth, Ill.	
Out-Offs—Rain Water. Sullivan-Geiger Co., Indianapolis, Ind.	Heaters—Warm Air. A-B Stove Co., Battle Creek, Mich. American Furnace Co., St. Louis, Mo. Black Diamond Furnace Co., Monmouth, Ill. Central Heating Supply Co., Chicago, Ill. Cooperative Foundry Co., Rochester, New York Danville Stove & Mfg. Co., Danville, Pa. Excelsior Steel Furnace Co., Chicago, Ill. Farris Furnace Co., Springfield, Mass. Forest City Fdy. & Mfg. Co., Cleveland, Ohio Germer Stove Co., Erie, Pa. Haynes-Langenberg Mfg. Co., St. Louis, Mo. Hall-Neal Furnace Co., Indianapolis, Ind. Hammond Heating Co., Cincinnati, Ohio Henry Furnace & Fdy. Co., Cleveland, Ohio Hero Furnace Co., Chicago, Ill. Hess-Snyder Co., Massillon, Ohio Lennox Furnace Co., Marshalltown, Iowa Magee Furnace Co., Boston, Mass. Mahoning Fdy. Co., Youngstown, Ohio	Ment and Food Choppers. Enterprise Mfg. Co. of Pa., Philadelphia, Pa.	
Dampers—Hot Air. Howes Co., The S. M., Boston, Mass.	Heaters—Warm Air. A-B Stove Co., Battle Creek, Mich. American Furnace Co., St. Louis, Mo. Black Diamond Furnace Co., Monmouth, Ill. Central Heating Supply Co., Chicago, Ill. Cooperative Foundry Co., Rochester, New York Danville Stove & Mfg. Co., Danville, Pa. Excelsior Steel Furnace Co., Chicago, Ill. Farris Furnace Co., Springfield, Mass. Forest City Fdy. & Mfg. Co., Cleveland, Ohio Germer Stove Co., Erie, Pa. Haynes-Langenberg Mfg. Co., St. Louis, Mo. Hall-Neal Furnace Co., Indianapolis, Ind. Hammond Heating Co., Cincinnati, Ohio Henry Furnace & Fdy. Co., Cleveland, Ohio Hero Furnace Co., Chicago, Ill. Hess-Snyder Co., Massillon, Ohio Lennox Furnace Co., Marshalltown, Iowa Magee Furnace Co., Boston, Mass. Mahoning Fdy. Co., Youngstown, Ohio	Metals—Perforated. Harrington & King Perforating Co., Chicago, Ill.	
Draft Regulators. Sahlm Mfg. Co., Grand Rapids, Mich.	Heaters—Warm Air. A-B Stove Co., Battle Creek, Mich. American Furnace Co., St. Louis, Mo. Black Diamond Furnace Co., Monmouth, Ill. Central Heating Supply Co., Chicago, Ill. Cooperative Foundry Co., Rochester, New York Danville Stove & Mfg. Co., Danville, Pa. Excelsior Steel Furnace Co., Chicago, Ill. Farris Furnace Co., Springfield, Mass. Forest City Fdy. & Mfg. Co., Cleveland, Ohio Germer Stove Co., Erie, Pa. Haynes-Langenberg Mfg. Co., St. Louis, Mo. Hall-Neal Furnace Co., Indianapolis, Ind. Hammond Heating Co., Cincinnati, Ohio Henry Furnace & Fdy. Co., Cleveland, Ohio Hero Furnace Co., Chicago, Ill. Hess-Snyder Co., Massillon, Ohio Lennox Furnace Co., Marshalltown, Iowa Magee Furnace Co., Boston, Mass. Mahoning Fdy. Co., Youngstown, Ohio	Miters. Friedley-Voshardt Co., Chicago, Ill.	
Dumb Waiters. Sedgwick Machine Works, New York, Y.	Heaters—Warm Air. A-B Stove Co., Battle Creek, Mich. American Furnace Co., St. Louis, Mo. Black Diamond Furnace Co., Monmouth, Ill. Central Heating Supply Co., Chicago, Ill. Cooperative Foundry Co., Rochester, New York Danville Stove & Mfg. Co., Danville, Pa. Excelsior Steel Furnace Co., Chicago, Ill. Farris Furnace Co., Springfield, Mass. Forest City Fdy. & Mfg. Co., Cleveland, Ohio Germer Stove Co., Erie, Pa. Haynes-Langenberg Mfg. Co., St. Louis, Mo. Hall-Neal Furnace Co., Indianapolis, Ind. Hammond Heating Co., Cincinnati, Ohio Henry Furnace & Fdy. Co., Cleveland, Ohio Hero Furnace Co., Chicago, Ill. Hess-Snyder Co., Massillon, Ohio Lennox Furnace Co., Marshalltown, Iowa Magee Furnace Co., Boston, Mass. Mahoning Fdy. Co., Youngstown, Ohio		
Eaves Trough. Abbott Mfg. Co., Cleveland, Ohio Berger Bros. Co., Philadelphia, Pa. Burton Co., The W. J., Detroit, Mich. Clark-Smith Hardware Co., Peoria, Ill. Milwaukee Corrugating Co., Milwaukee, Wis.	Heaters—Warm Air. A-B Stove Co., Battle Creek, Mich. American Furnace Co., St. Louis, Mo. Black Diamond Furnace Co., Monmouth, Ill. Central Heating Supply Co., Chicago, Ill. Cooperative Foundry Co., Rochester, New York Danville Stove & Mfg. Co., Danville, Pa. Excelsior Steel Furnace Co., Chicago, Ill. Farris Furnace Co., Springfield, Mass. Forest City Fdy. & Mfg. Co., Cleveland, Ohio Germer Stove Co., Erie, Pa. Haynes-Langenberg Mfg. Co., St. Louis, Mo. Hall-Neal Furnace Co., Indianapolis, Ind. Hammond Heating Co., Cincinnati, Ohio Henry Furnace & Fdy. Co., Cleveland, Ohio Hero Furnace Co., Chicago, Ill. Hess-Snyder Co., Massillon, Ohio Lennox Furnace Co., Marshalltown, Iowa Magee Furnace Co., Boston, Mass. Mahoning Fdy. Co., Youngstown, Ohio		
Elbows and Shoes—Conductor. Dieckmann Co., Ferdinand, Ind. Lupton's Sons Co., David, Philadelphia, Pa.	Heaters—Warm Air. A-B Stove Co., Battle Creek, Mich. American Furnace Co., St. Louis, Mo. Black Diamond Furnace Co., Monmouth, Ill. Central Heating Supply Co., Chicago, Ill. Cooperative Foundry Co., Rochester, New York Danville Stove & Mfg. Co., Danville, Pa. Excelsior Steel Furnace Co., Chicago, Ill. Farris Furnace Co., Springfield, Mass. Forest City Fdy. & Mfg. Co., Cleveland, Ohio Germer Stove Co., Erie, Pa. Haynes-Langenberg Mfg. Co., St. Louis, Mo. Hall-Neal Furnace Co., Indianapolis, Ind. Hammond Heating Co., Cincinnati, Ohio Henry Furnace & Fdy. Co., Cleveland, Ohio Hero Furnace Co., Chicago, Ill. Hess-Snyder Co., Massillon, Ohio Lennox Furnace Co., Marshalltown, Iowa Magee Furnace Co., Boston, Mass. Mahoning Fdy. Co., Youngstown, Ohio		
Elevators—Hand and Power. Kimball Bros. Co., Council Bluffs, Iowa Sedgwick Machine Works, New York, Y.	Heaters—Warm Air. A-B Stove Co., Battle Creek, Mich. American Furnace Co., St. Louis, Mo. Black Diamond Furnace Co., Monmouth, Ill. Central Heating Supply Co., Chicago, Ill. Cooperative Foundry Co., Rochester, New York Danville Stove & Mfg. Co., Danville, Pa. Excelsior Steel Furnace Co., Chicago, Ill. Farris Furnace Co., Springfield, Mass. Forest City Fdy. & Mfg. Co., Cleveland, Ohio Germer Stove Co., Erie, Pa. Haynes-Langenberg Mfg. Co., St. Louis, Mo. Hall-Neal Furnace Co., Indianapolis, Ind. Hammond Heating Co., Cincinnati, Ohio Henry Furnace & Fdy. Co., Cleveland, Ohio Hero Furnace Co., Chicago, Ill. Hess-Snyder Co., Massillon, Ohio Lennox Furnace Co., Marshalltown, Iowa Magee Furnace Co., Boston, Mass. Mahoning Fdy. Co., Youngstown, Ohio		
Enamel—Iron. Black Silk Stove Polish Works, Sterling, Ill. Nickel Plate Stove Polish Co., Chicago, Ill.	Heaters—Warm Air. A-B Stove Co., Battle Creek, Mich. American Furnace Co., St. Louis, Mo. Black Diamond Furnace Co., Monmouth, Ill. Central Heating Supply Co., Chicago, Ill. Cooperative Foundry Co., Rochester, New York Danville Stove & Mfg. Co., Danville, Pa. Excelsior Steel Furnace Co., Chicago, Ill. Farris Furnace Co., Springfield, Mass. Forest City Fdy. & Mfg. Co., Cleveland, Ohio Germer Stove Co., Erie, Pa. Haynes-Langenberg Mfg. Co., St. Louis, Mo. Hall-Neal Furnace Co., Indianapolis, Ind. Hammond Heating Co., Cincinnati, Ohio Henry Furnace & Fdy. Co., Cleveland, Ohio Hero Furnace Co., Chicago, Ill. Hess-Snyder Co., Massillon, Ohio Lennox Furnace Co., Marshalltown, Iowa Magee Furnace Co., Boston, Mass. Mahoning Fdy. Co., Youngstown, Ohio		

<p>Quadrants—Damper Parker Supply Co., New York, N. Y.</p> <p>Ranges—Combination Gas & Coal Quick Meal Stove Co., St. Louis, Mo.</p> <p>Ranges—Gas. Germer Stove Co., Erie, Pa. Quick Meal Stove Co., St. Louis, Mo.</p> <p>Rasps Diaston & Sons, Inc., Henry, Philadelphia, Pa. Heller Bros., Newark, N. J. Nicholson File Co., Providence, Rhode Island</p> <p>Refrigerators—Iceless Sedgwick Machine Works, New York, N. Y.</p> <p>Register Shields Hall-Neal Furnace Co., Indianapolis, Ind.</p> <p>Registers—Cash Nat'l Cash Reg. Co., Rochester, N. Y.</p> <p>Registers—Warm Air American Wood Register Co., Plymouth, Ind. Hart & Cooley Co., New Britain, Conn. Henry Furnace & Fdy. Co., Cleveland, Ohio Independent Reg. & Mfg. Co., Cleveland, Ohio Manny Heating Supply Co., Chicago, Indiana Marsh Lumber Co., Dover, Ohio Rock Island Register Co., Rock Island, Ill. Standard Furnace & Supply Co., Omaha, Neb. Stearns Register Co., Detroit, Mich. Symonds Register Co., St. Louis, Mo. Tuttle & Bailey Mfg. Co., Chicago, Ill. U. S. Register Co., Battle Creek, Mich. Walworth Run Fdy. Co., Cleveland, Ohio Waterloo Register Co., Waterloo, Iowa</p> <p>Regulators—Damper Parker Supply Co., New York, N. Y.</p> <p>Repairs—Stove & Furnace Central Stove & Furnace Repair Co., Chicago, Ill. Hessler Co., H. E., Syracuse, N. Y. Nat'l Stove Repair Co., Cincinnati, Ohio Northwestern Stove Repair Co., Chicago, Ill.</p> <p>Revolvers Johnson's Arms & Cycle Wks., Iver, Fitchburg, Mass.</p> <p>Rivets—Stove Kirk-Latty Mfg. Co., Cleveland, Ohio</p> <p>Roasters. Lalance & Grosjean Mfg. Co., Chicago, Ill.</p> <p>Rod Clips—Damper Parker Supply Co., New York, N. Y.</p> <p>Rods—Stove Kirk-Latty Mfg. Co., Cleveland, Ohio</p> <p>Rolls—Forming Bertsch & Co., Cambridge City, Ind. Niagara Machine & Tool Wks., Buffalo, N. Y.</p> <p>Roof—Flashing Hessler Co., H. E., Syracuse, N. Y.</p> <p>Roofing—Iron and Steel American Sheet & Tin Plate Co., Pittsburgh, Pa. Brier Hill Steel Co., Youngstown, Ohio Burton Co., W. J., Detroit, Mich. Cortright Metal Roofing Co., Philadelphia, Pa. Friedley-Voshardt Co., Chicago, Ill. Inland Steel Co., Chicago, Ill. Milwaukee Corrugating Co., Milwaukee, Wis. Sykes Co., The, Chicago, Ill.</p>	<p>Roofing—Zinc American Zinc Products Co., Greencastle, Ind.</p> <p>Rubbish Burners Hart & Cooley Co., New Britain, Conn.</p> <p>Rules Lufkin Rule Co., Saginaw, Mich.</p> <p>Sanitary Specialties Coleman, Allan J., Chicago, Ill.</p> <p>Sash Balances Caldwell Mfg. Co., Rochester, N. Y.</p> <p>Saws Diaston & Sons, Inc., Henry, Philadelphia, Pa.</p> <p>Schools—Heating and Ventilating Engineering Cleveland Engineering Institute Cleveland, Ohio</p> <p>Schools — Sheet Metal Pattern Drafting St. Louis Technical Institute, St. Louis, Mo.</p> <p>Screens—Perforated Metal Harrington & King Perforating Co., Chicago, Ill.</p> <p>Screws—Sheet Metal Parker Supply Co., New York, N. Y.</p> <p>Screw Drivers North Bros. Mfg. Co., Philadelphia, Pa.</p> <p>Sheets—Black and Galvanized American Sheet & Tin Plate Co., Pittsburgh, Pa. Brier Hill Steel Co., Youngstown, Ohio Inland Steel Co., Chicago, Ill.</p> <p>Sheets—Blue Annealed Brier Hill Steel Co., Youngstown, Ohio</p> <p>Sheets—Planished Sykes Co., The, Chicago, Ill.</p> <p>Sheets—Steel Ryerson & Sons, Joseph T., Chicago, Ill.</p> <p>Shotguns Johnson's Arms & Cycle Wks., Iver, Fitchburg, Mass.</p> <p>Sifters—Ash Diener Mfg. Co., G. W., Chicago, Ill.</p> <p>Sifters—Flour Meyers Mfg. Co., Fred J., Hamilton, Ohio</p> <p>Skylights Burton Co., W. J., Detroit, Mich.</p> <p>Sleds The Auto-Wheel Coaster Co., Inc., No. Tonawanda, N. Y.</p> <p>Smoke Pipe—Cast Iron Manny Heating Supply Co., Chicago, Indiana Waterloo Register Co., Waterloo, Iowa</p> <p>Snips—Tinsmiths Niagara Machine & Tool Wks., Buffalo, N. Y.</p> <p>Solder—Aluminum Roesch, Geo. E., Aurora, Ill.</p> <p>Soldering Fluid Towner, F. A., Muskegon, Mich.</p> <p>Soldering—Furnaces Ashton Mfg. Co., Newark, N. J. Bernz Co., Otto, Newark, N. J. Burgess Soldering Furnace Co., Columbus, Ohio Clayton & Lambert Mfg. Co., Detroit, Mich. Diener Mfg. Co., G. W., Chicago, Ill. Double Blast Mfg. Co., North Chicago, Ill. Hones, Inc., Chas. A., Baldwin, Long Island, N. Y. Quick Meal Stove Co., St. Louis, Mo. Turner Brass Works, Sycamore, Ill.</p> <p>Soldering Irons Lupton's Sons Co., David, Philadelphia, Pa.</p> <p>Soldering Paste Towner, F. A., Muskegon, Mich.</p>	<p>Specialties—Hardware Bemis & Call Hdw. & Tool Co., Springfield, Mass. Bullard & Gormley, Chicago, Ill. Caldwell Mfg. Co., Rochester, N. Y. Chatsworth Mfg. Co., Chatsworth, Ill. Corbin Screw Corporation, New Britain, Conn. Diener Mfg. Co., G. W., Chicago, Ill. Diaston & Sons, Inc., Henry, Philadelphia, Pa. Enterprise Mfg. Co. of Pa., Philadelphia, Pa. Heller Bros. Co., Newark, N. J. Hessler Co., H. E., Syracuse, N. Y. Hyfield Mfg. Co., New York, N. Y. Lufkin Rule Co., Saginaw, Mich. Nicholson File Co., Providence, Rhode Island North Bros. Mfg. Co., Philadelphia, Pa. Richards-Wilcox Mfg. Co., Aurora, Ill. Rock Island Mfg. Co., Rock Island, Ill. Vaughan & Bushnell Mfg. Co., Chicago, Ill.</p> <p>Speedometers—Bicycle Corbin Screw Corporation, New Britain, Conn.</p> <p>Sporting Goods Bullard & Gormley, Chicago, Ill.</p> <p>Stars—Hard Iron Cleaning Fanner Mfg. Co., Cleveland, Ohio</p> <p>Statuary Friedley-Voshardt Co., Chicago, Ill. Gerock Bros. Mfg. Co., St. Louis, Mo.</p> <p>Stock Tanks Thomas & Armstrong Mfg. Co., London, Ohio</p> <p>Stock Waterers Rock Island Mfg. Co., Rock Island, Ill.</p> <p>Stoves—Camp Quick Meal Stove Co., St. Louis, Mo.</p> <p>Stoves—Gasoline and Kerosene Detroit Vapor Stove Co., Detroit, Mich. Nat'l Enameling & Stamping Co., Milwaukee, Wis. Quick Meal Stove Co., St. Louis, Mo.</p> <p>Stoves and Ranges A-B Stove Co., Battle Creek, Mich. Danville Stove & Mfg. Co., Danville, Pa. Germer Stove Co., Erie, Pa. Monitor Stove Co., Cincinnati, Ohio Quick Meal Stove Co., St. Louis, Mo. Roesch Enamel Range Co., Belleville, Ill. Schill Bros. Co., Crestline, Ohio</p> <p>Stove Pipe Reducer Sullivan-Geiger Co., Indianapolis, Ind.</p> <p>Stuffers—Sausage Enterprise Mfg. of Pa., Philadelphia, Pa.</p> <p>Suction Cups Coleman, Allan J., Chicago, Ill.</p> <p>Tacks, Staples, Spikes American Steel & Wire Co., Chicago, Ill.</p> <p>Tapes Lufkin Rule Co., Saginaw, Mich.</p> <p>Tiles and Shingles—Metal American Zinc Products Co., Greencastle, Ind. Burton Co., W. J., Detroit, Mich. Cortright Metal Roofing Co., Philadelphia, Pa. Milwaukee Corrugating Co., Milwaukee, Wis. Thomas & Armstrong Mfg. Co., London, Ohio</p> <p>Tin—Perforated Harrington & King Perforating Co., Chicago, Ill.</p> <p>Tinplate American Sheet & Tin Plate Co., Pittsburgh, Pa.</p>	<p>Tools—Auto Repair Curfman Mfg. Co., F. L., Chicago, Ill. International Radiator Co., Maryville, Mo.</p> <p>Tools—Carpenter Diaston & Sons, Inc., Henry, Philadelphia, Pa. Lufkin Rule Co., Saginaw, Mich. North Bros. Mfg. Co., Philadelphia, Pa. Vaughan & Bushnell Mfg. Co., Chicago, Ill.</p> <p>Tools—Tinsmiths Bertsch & Co., Cambridge City, Ind. Dreis & Krump Mfg. Co., Chicago, Ill. Howes Co., S. M., Boston, Mass. Marshalltown Mfg. Co., Marshalltown, Iowa Niagara Machine & Tool Wks., Buffalo, N. Y. Ryerson & Son, Joseph T., Chicago, Ill. Vaughan & Bushnell Mfg. Co., Chicago, Ill. Viking Shear Co., Erie, Pa. Whitney Mfg. Co., W. A., Rockford, Ill.</p> <p>Torches Ashton Mfg. Co., Newark, N. J. Bernz, Otto, Newark, N. J. Burgess Soldering Furnace Co., Columbus, Ohio Clayton & Lambert Mfg. Co., Detroit, Mich. Diener Mfg. Co., G. W., Chicago, Ill. Double Blast Mfg. Co., North Chicago, Ill. Hones, Inc., Chas. A., Baldwin, Long Island, N. Y. Quick Meal Stove Co., St. Louis, Mo. Turner Brass Works, Sycamore, Ill.</p> <p>Trimings—Stove Fanner Mfg. Co., Cleveland, Ohio</p> <p>Valves—Humidifier. Haynes, Kansas City, Mo. Riekse Mfg. Co., Grand Rapids, Mich.</p> <p>Ventilators Basman Co., Inc., A. M., Detroit, Mich. Berger Bros. Co., Philadelphia, Pa. Friedley-Voshardt Co., Chicago, Ill. Standard Ventilator Co., Lewisburg, Pa. Thomas & Armstrong Mfg. Co., London, Ohio</p> <p>Ventilators—Ceiling Hart & Cooley Co., New Britain, Conn. Henry Furnace & Fdy. Co., Cleveland, Ohio Tuttle & Bailey Mfg. Co., Chicago, Ill.</p> <p>Vices North Bros. Mfg. Co., Philadelphia, Pa. Rock Island Mfg. Co., Rock Island, Ill.</p> <p>Wagons—Auto-Wheel Coaster The Auto-Wheel Coaster Co., Inc., No. Tonawanda, N. Y.</p> <p>Water Outlets Ajax Bracket and Outlet Co., Cleveland Heights, Ohio</p> <p>Window Cleaners Coleman, Allan J., Chicago, Ill.</p> <p>Wire American Steel & Wire Co., Chicago, Ill. Pittsburgh Steel Co., Chicago, Ill.</p> <p>Wood Faces American Wood Register Co., Plymouth, Ind. Marsh Lumber Co., Dover, Ohio</p> <p>Wrenches Bemis & Call Hdw. & Tool Co., Springfield, Mass. Coes Wrench Co., Worcester, Mass.</p> <p>Zinc American Zinc Products Co., Greencastle, Ind.</p>
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WANTS AND SALES

For paid yearly subscribers, **AMERICAN ARTISAN AND HARDWARE RECORD** will insert under this head advertisements of not more than fifty words **WITHOUT CHARGE**. Employers wishing to secure employes, parties desiring to purchase or sell business, secure partners, or to exchange, etc., will find that these pages offer excellent opportunities to satisfy their wants. Clerks and tinsmiths looking for situations will find it to their advantage to use these columns. Those who respond to these announcements please mention that they "READ THE ADVERTISEMENT IN AMERICAN ARTISAN AND HARDWARE RECORD."

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For Sale—Furnace. Hart and Crouse Company, makers. It has 29" fire pot, 63" casing and its heating capacity is 70,000 cubic feet. Suitable for church or hall. Hogan and Company, 3163 Archer Avenue, Telephone McKinley 3071, Chicago, Illinois. 24-3t

For Sale—Only exclusive radiator, repairing and recoring shop in Norfolk, Nebraska. Population ten thousand. New \$265 automatic air compressor. City gas and lights. Reason for selling, eyes failing. Address Norfolk Auto Tanners, 723 Norfolk Avenue, Norfolk, Nebraska. 25-3t

For Sale—160 acres cut-over timber land 7½ miles southeast of Jonesboro, Arkansas, 2½ miles from Frisco and 2½ miles to Iron Mountain Railroad. Hard surfaced road within two miles of land. Would trade for stock of hardware. Address L. F. S., care of Perryville Hardware Company, Perryville, Missouri. 24-3t

For Sale—Patent right for Sanitary cold air register, grill and ventilator. Something new. Easily and cheaply made. Just the thing to use in connection with pipeless furnaces as well as multipipe installations. Neat and strong. It is worth while for you to investigate. Address A. Henry, Heating Engineer, Nebraska City, Nebraska. 25-3t

For Sale — A well established hardware business. Stock \$20,000. Unusually attractive for live and experienced hardware man. Located in a most rapidly growing city of northern Illinois. Big outlet for builders' hardware, tools, paints and factory supplies. Owner has other business ventures requiring more personal attention. No traders or sacrifices sale considered. Kindly address B-63, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 23-4t

For Sale—Plumbing and tin shop, located in rear end of hardware store. Will sell for \$1,000 cash, including stock and tools; also touring car. This town is located in Iowa, population about 1,500. Good hotels, schools and churches. Plenty of work and a rich territory to work on. A good opportunity for a young man who wishes to start in business. Am leaving the State. Address B-71, Care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 25-4t

For Sale—Tin shop in north-central Iowa. Full set of tools with eight foot brake. Will also sell building or rent it for a reasonable price. Full glass front. Established five years. Population between 800 and 900. Good school and churches. Only shop in town. Fine country. Plenty of work. Address B-68, Care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 25-3t

Business Chance—We offer the following surplus stock for sale: Allith-Prouty-Sharon or Richards-Wilcox Square barn door track 18; brackets 16; one ton slightly rusted No. 5 market wire, 4c lb.; 500 lbs. light seamless copper tubing, ¼ to ¾", 45c lb.; one ton 50-50 solder, 24c; one bbl. olive drab paint, \$1.25; 50 rolls 30" galvanized poultry netting, \$2.50 roll; 5 kegs 8d steel cut nails, \$4.50 case; 10 30x3¼, ten 30x3½ Auburn tires at \$13.75; eight 30x3 Auburn tires at \$9.00, and four 30x3 Archer tires at \$6.75. VanDervoort Hardware Company, Lansing, Michigan. 24-3t

BUSINESS CHANCES

For Sale—One No. 24 Giblin hot water heating boiler. Good as new except grates. Capacity 1,500 feet. Will sell at a bargain. Write at once to J. Oscar Smith, Moberly, Missouri. 25-3t

For Sale—Forty acres of improved land with some timber, one mile from city of Wausau. Will sell for \$1,600. Have also store fixtures for sale. Address T. Oelke, 621 Scott Street, Wausau, Wisconsin. 25-3t

Lightning Rods—Big profits and quick sales to live dealers selling "DIDDLE'S UNIVERSAL RODS." Our copper tests 99.96% pure. Prices are right—get our agency. L. F. Diddle Company, Marshfield, Wisconsin. 15-ufn

Wanted to Buy—Small hardware store in or near Chicago. When replying please state particulars. Address B-55, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 22-ufn

HELP WANTED

Wanted—An all around man to commence work March 1st. State wages and give references in first letter. Leonard Hardware Company, Blanchardville, Wisconsin. 25-3t

Wanted—A tinner and furnace man. One who is experienced to clerk in hardware store. State wages and particulars in first letter. Address Joe J. Voegeli, Monticello, Wisconsin. 25-3t

Wanted—Tinner. Steady employment to do inside and outside work, one who knows something of plumbing. State wages in first letter. Address C. H. Kerr and Company, Nokomis, Illinois. 26-3t

Wanted—A first-class plumber to take full charge of shop. Plenty of business. Located in north central Iowa. Address B-67, Care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 25-3t

Wanted—Department foreman capable of handling twelve employees in large Milwaukee sheet metal shop. Good job for the right man. Address B-73, Care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 25-3t

Wanted—Foreman to take charge of shop doing stock yard sheet metal work. One who can lay out work and handle men. Address B-64, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 24-3t

Wanted by January 1st—A first-class sheet metal worker who is desirous of going into partnership. Must know how to estimate jobs. We have a good field here for a live man. If interested please write to Mr. J. F. Leith, West Side Sheet Metal Works, 6700 Madison Avenue, Cleveland, Ohio. 25-3t

Wanted—All around plumber and tinsmith in good county seat town in northeastern Nebraska. Steady work by the year. State wages wanted in first letter. Please address B-76, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 26-3t

Wanted—A combination plumber and tinner. Must be able to estimate and do any kind of plumbing, lead work, etc. We have a good steady job for a good man the year around. Kindly address B-79, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 26-3t

Wanted—Young man with initiative, experienced in jobbing furnace supplies, to take charge of small business now connected with furnace manufacturing. Object to develop the jobbing branch. Good chance for right young man. Address B-78, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 26-3t

SITUATION WANTED

Situation Wanted—By good mechanic, tinner and furnace man. Can lay out work and figure jobs. Small town preferred. State wages in first letter. Address Tinner, 315 South 31st Street, Omaha, Nebraska. 25-3t

Situation Wanted—By combination tinner and plumber. Have had 30 years' experience. Can do anything that comes up in a shop. Am 46 years old. Must be steady job. State wages in first letter. Address B-69, Care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 25-3t

SITUATION WANTED.

Situation Wanted—as furnace salesman. Have had 15 years practical experience in the heating line. Address B-65, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 24-3t

Situation Wanted — By a first-class sheet metal worker. Must be steady. Can do all kinds of sheet metal and furnace work. Am sober and married. Address B-67, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 24-3t

Situation Wanted—By an all around tinner with a reliable firm. Have had 25 years' experience. Will be open for a job about the middle part of January. Address B-62, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 23-4t

Situation Wanted — By a first-class plumber, tinner and heating man. Can layout work and read blue prints. Please state particulars in first letter. Address B-77, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 26-3t

Salesman—Traveling Illinois, calling on furnace dealers, desires reputable side line where sales and earnings are large. Desire manufacturer's line. Address B-75, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 25-3t

Situation Wanted — As superintendent or working foreman in sheet metal shop. Have had 25 years' experience. Would like to connect with some northern Illinois concern. Address B-74, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 25-3t

Situation Wanted—By a first-class sheet metal worker. Can do all kinds of sheet metal and furnace work. Am sober and married. Nothing but a steady job. Address B-70, Care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 25-3t

Situation Wanted—By all around tinner and furnace man. Have had ten years' experience. Can handle any kind of furnace work. Kindly address B-60, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 23-4t

Situation Wanted—By a first-class plumber and fitter. Can also do tinning and do estimating on plumbing and heating. Have had 17 years' experience. Please state particulars. Address B-66, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois. 24-3t

TINNERS' TOOLS

Wanted—Second hand screw case and nail bins. Cambridge Hardware Company, Cambridge, Wisconsin. 25-3t

Wanted to Buy—Four foot wood double truss brake. G. F. Chapman, 502 Jackson Street, Tampa, Florida. 24-3t

Wanted—A second hand eight foot cornice brake. State condition and price. Lee Smith, Union City, Michigan. 25-3t

BOOKS.

Wanted—Men who know their trade from A to Z. That's the way the advertisements for Help Wanted start. You can learn more about your trade if you read good books on the subjects you are less familiar with. For a book covering the subject of Warm Air Heating thoroughly, you should read Snow's Furnace Heating. 234 pages. Price \$2.50. With AMERICAN ARTISAN one year (52 issues), \$3.85. Order your copy today from AMERICAN ARTISAN, 620 South Michigan Avenue, Chicago, Illinois.

For Sale—To those who wish to save time and money. J. W. Conchar's PRICE MAKER AND PROFIT DETERMINER is just the thing you need. This handy volume will be of the greatest value to you in regulating the list and selling prices of any article. The tables in this book are arranged to show the sold cost and the net profit and the percentage that must be added to the actual warehouse or store cost to bring the result desired. 170 pages. Cloth \$2.00, postage prepaid. Address AMERICAN ARTISAN, 620 South Michigan Boulevard, Chicago, Illinois.

Fuel Economy

IT is one of the most important factors in determining the desirability of a heating plant. The shortage of coal and the unusually high prices have caused house owners to carefully consider the efficiency of furnaces before purchasing. You can turn this tendency to your advantage if you sell the



GILT EDGE LIBERTY FURNACE



Cut showing travel of heated gases in radiator



It is designed to get the maximum amount of heat out of the fuel, and to distribute that heat effectively. Note the long fire travel graphically indicated in the illustration at the left. The heated gases travel in a solid volume around the entire circumference of the radiator. This insures even distribution of heat and prevents losses due to unnecessary escape up the chimney. The nearly vertical sides of the fire pot insure an even fire and a consequent increased efficiency in the firebox. Anti-Clinker grates, sectional fire pot, and above all the Schwab dealer co-operation and sales aids make the Gilt Edge the most profitable furnace agency for you.

*Write for catalog and the
Schwab Co-operative Sales
Plan today.*

R. J. Schwab & Sons Co.

285 Clinton Street

MILWAUKEE

WISCONSIN



Moncrief



TRADE MARK



RECORD BREAKING PIPELESS FURNACES

RIGHT now our dealers are breaking all records for sales with the MONCRIEF PIPELESS FURNACE.

This is only natural because Moncrief Pipe Furnaces have always been producers of big sales for our dealers and the MONCRIEF PIPELESS contains the same high qualities that have made the name MONCRIEF famous. We want to prove to you that the MONCRIEF PIPELESS is all that we say it is. We want to send you our circulars and catalogs which describe it in detail. We are ready to convince you that the MONCRIEF PIPELESS has many exclusive features that make it not only the leader in sales but in customer satisfaction as well. Write today for circulars.

MONCRIEF ALL CAST FURNACES

MONCRIEF dealers usually have no trouble in obtaining the bulk of the pipe furnace business in their territories. For more than twenty years MONCRIEF ALL CAST FURNACES meant the most in Durability, Economy and Efficient Construction.

MONCRIEF dealers never lose sales because of competition. There are no weak points in the MONCRIEF sales story. They possess many original high class features not found in other heaters.

Let us send you the data which contains the detailed information concerning the construction of MONCRIEF ALL CAST FURNACES. Let us show you that they occupy a foremost position in the heating world and their good reputation means good business for you.



SERIES A

THE HENRY FURNACE

PLANTS AT CLEVELAND, OHIO—MEDINA, OHIO



Moncrief



TRADE MARK

THIS LETTER PROVES IT

Read it through right now. It tells the story.

RHODES HARDWARE COMPANY
HARDWARE

PLUMBING

HEATING

Painesville, Ohio, September 20th 1920

The Henry Furnace & Foundry Co.,
Cleveland, Ohio.

Gentlemen:-

Under separate cover, we are mailing you a photograph of our Booth at the Lake County Fair which was held from Sept. 8th to 11th, where we exhibited MONCRIEF PIPE and PIPELESS Furnaces.

We consider the results obtained splendid. Besides securing orders for about twenty-five furnaces, mostly pipeless, we have a list of prospects numbering over fifty and we feel confident we will sell every one of them.

Among the visitors at our Booth were several people who have been using the MONCRIEF PIPELESS Furnace for the last two winters and they are so satisfied with the results they are boosting our furnace and telling all their friends about it.

As a reminder, when may we expect our next car of Pipeless furnaces. We would like to have them soon for we have several orders to be filled out of this car and many more which we expect to receive as a result of our exhibit.

Yours very truly,

RHODES HARDWARE COMPANY.

*Manufacturers of
Pipe and Fittings,
in fact every ac-
cessory for a warm
air heating job.*

THE agency for MONCRIEF PIPE AND PIPELESS FURNACES for your territory can mean as much for you as it means for the Rhodes Hardware Co. Your customers will boost the MONCRIEF PIPELESS for you just as many other MONCRIEF dealers' customers are boosting it for them. The MONCRIEF agency carries with it an envied and well known reputation of twenty years' standing, an asset that no live dealer can afford to pass up without investigation.

Write us today, let us tell you all about it.

E & FOUNDRY CO.

CHAGRIN FALLS, OHIO—INDIANAPOLIS, IND.

The Weir
costs more
to buy
But
less to keep



The Weir
Does
Save
Coal

The Weir
makes a booster
out of a
customer

THE WEIR

ALL STEEL

Gas and Soot Consuming

FURNACE

is to other furnaces what the cord tire is to fabric tires. Fabric tires are mighty good, and they cost less to own—BUT MORE PER MILE OF SERVICE.

The WEIR FURNACE costs more to own, but when you have sold a customer a WEIR you have not only made more money on the original sale than on lower priced furnaces,

**BUT YOU HAVE MADE A BOOSTER
OF THE CUSTOMER. THAT ONE
SALE WILL PRODUCE OTHERS TO
THE FRIENDS OF THAT OWNER.**

So many dealers have already had that experience that the statement is more than a mere statement of fact—it has become a business HABIT.

The WEIR salesman can show you exactly HOW and WHY this happens so often, and he'll be able to show you how and why

YOU SHOULD SELL THE WEIR IN 1921

MEYER FURNACE COMPANY

PEORIA

ILLINOIS

The Weir
Does
Save
Coal

JOIN CALORIC



The CaloriC Pipeless Furnace leads the furnace industry with over 125,000 satisfied users.

CaloriC leads in production—today the largest manufacturer of warm-air furnaces in the world.

CaloriC leads in dealer profits. Unequalled production means manufacturing efficiency—and a quality product at a price competition cannot meet.

CaloriC leads in advertising. A page in the Saturday Evening Post every four weeks—a page in colors in the Country Gentleman every four weeks—and an aggressive campaign in more than a score of the foremost national, state and sectional farm papers in America.

The CaloriC is the heating achievement of the century. Its market is universal. Its advertising has gained a momentum that is irresistible. An Exceptional Opportunity for progressive hardware men, furnace men and other dealers, in choice territories still open. Write or wire



THE MONITOR STOVE COMPANY

102 Years in Business

(The Monitor Family)

500 Gest St., Cincinnati, Ohio

Branches: New York, St. Paul, Omaha, Spokane, Atlanta

**— WHY FOLLOW *when*
you can go with the LEADER**

BUSINESS LEADERSHIP



BUILDERS of HAPPINESS
For over a century

As the centuries unfold, Progress, at the forge of Creation, works his miracles for the happiness of mankind.

Striving through a hundred years to perfect the science of heating, The Monitor Stove Company gave to the world its supreme achievement—The CaloriC Pipeless Furnace.

The Monitor organization, idealized in "The Monitor Family," is today marketing the CaloriC around the world. CaloriC supremacy is an established fact in over 125,000 homes.

The same outstanding leadership and devotion to ideals of quality and service that gained fame for Monitor stoves and ranges throughout the 19th century are the inspiring ideals of The Monitor Family in 1920. Through the years the CaloriC vision grows.

"BUILDERS OF HAPPINESS—VISION AHEAD!"

THE MONITOR STOVE COMPANY
102 Years in Business (The Monitor Family) Cincinnati, Ohio
Branches: New York, St. Paul, Omaha, Spokane, Atlanta

PIPELESS CALORIC FURNACE




LARGEST MANUFACTURERS OF WARM-AIR FURNACES IN THE WORLD

The advertisement above appears in the Saturday Evening Post, December 25, and will carry the message of CaloriC ideals and success into over two million homes. It is a powerful symbolical expression of Monitor achievement and Monitor vision. This advertisement will be followed by 13 full pages in the Post in 1921.

Dealer Cooperation

- and

*what we think
it means to you*

52 years of
experience
behind this
heater



ALL the various dealer helps produce an effect really beneficial to you only when the product itself represents your greatest business getting help.

A warm air heater that will advertise itself by its performance truly represents the best co-operation that its manufacturer could give you.

For over fifty-two years we have been giving this kind of cooperation to our dealers.

Today it is bringing them EMPIRE PIPELESS sales and safe profits from customers who know of its quality and heating ability through actual performance.

We believe that this is the kind of dealer cooperation that you want. We know that it is proving the most profitable for our many dealers in the long run.

The good reputation of the Red Cross EMPIRE PIPELESS means for you the holding of your good reputation.

Let us write you a letter now regarding the agency for your territory.

Write for catalogs and circulars today

CO-OPERATIVE FOUNDRY CO.
ROCHESTER, NEW YORK

Western Branch: 505 S. Clinton St., CHICAGO, ILL.

*Manufacturers of the
Celebrated Red Cross Stoves, Ranges and Furnaces*

The Red Cross

EMPIRE PIPELESS

Warm Air Heater



MANY dealers and users of the MASTER ONE-PIPE FURNACE claim that it is the best one-pipe furnace on the market.

We would be glad to have you pass judgment on it both as a HEATER and a PROFIT MAKER.

A request will bring you full particulars

Write today

MASTER

ONE-PIPE FURNACE

SINCE its first appearance on the market the MASTER has enjoyed big sales.

It is a strong, durable heater built much heavier than most one-pipe furnaces. It contains a superior quality of construction, which makes it stand out in its field as a one-pipe heater that is unusually successful in operation.

The MASTER is making good and satisfying thousands of home owners. It is bringing to our dealers the kind of profits that last—the profits of customers well served.

We have circulars and catalogs that give the mechanical description of the MASTER. If you will send us your name we will be pleased to send them to you. We also have an agency and sales plan that will interest you because of the very liberal profits that it allows the dealer.

*Shall we mail this plan to you?
A postal request will bring it.*

TUBULAR HEATING & VENTILATING CO.

228 Quarry Street

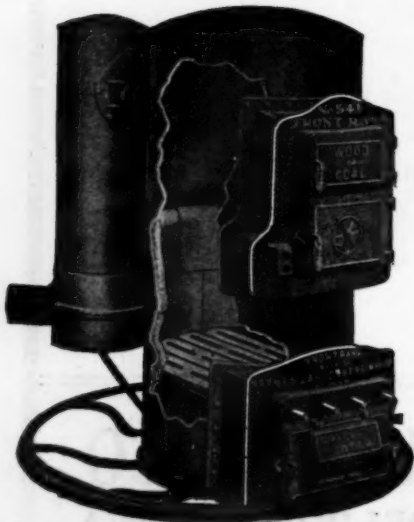
PHILADELPHIA, PENNA.



FRONT RANK

TRADE NAME REGISTERED

Warm Air Heaters



FOR over *thirty* years these STEEL FURNACES have been giving good, safe profits to our dealers and clean, economical heating service to users everywhere.

FRONT RANK furnaces are made of heavy steel plate. They are cold riveted and absolutely gas and soot proof. They won't crack or warp. They have extra large radiating surfaces and are famous for their fuel saving qualities. The **FRONT RANK** agency for your territory may still be open. Let us tell you about the dealer cooperation we give. It is complete in every way and it will get big sales for you during 1921.

WRITE TODAY FOR FULL DETAILS AND COMPLETE CATALOG

HAYNES-LANGENBERG MFG. CO.

4058 Forest Park Avenue

ST. LOUIS, MO.

EXCELSIOR MONOPIPE RECIRCULATING FURNACE

HEATS WITH VAPORIZED WARM AIR



THE FINEST
ONE-REGISTER
FURNACE

ON THE MARKET

The demand for this apparatus this year has largely exceeded our capacity to supply the same.

We are, however, making preparations for a large increase in production for 1921.

The agency for this Furnace will prove a valuable asset.

Write us for prices and catalogs on our complete line of Furnaces, Excelsior Heating Specialties, embracing Excelsior Self-locking Double Wall Pipe and Fittings, also Excelsior Stove Pipe and Elbows, Registers, Etc.

THE EXCELSIOR STEEL FURNACE CO.

Phone
Main 4430

114-118 So. Clinton Street
CHICAGO, ILL.

Catalog
upon request

"HOME COMFORT"

THERE ARE NO BETTER WARM AIR HEATERS

THESE heaters because of their many particularly desirable features have been for many years comfortable profit makers for thousands of dealers as well as comfortable heaters for many thousands of home owners. Simplicity, economy, and home comfort are some of their distinctive qualities.

Their steel, air-tight construction and their large radiating surface provide users with an unusually large volume of clean, comfortably warmed air.



*The Combustion
Chamber
is made of
one sheet
No. 8 Gauge
Open Hearth
Steel Plate*

*There are no
Cemented Joints
in this Heater
to cause Leakage
of Gas or Smoke
into the Warm
Air Chamber*

HOME COMFORT WARM AIR HEATERS are now made by this new company composed of men who have been identified with the original makers for more than twenty years.

We make HOME COMFORT WARM AIR HEATERS exclusively and, because of our long years of experience in making and selling them both dealers and users can rely upon the same high standard of quality, material and workmanship which have been embodied in HOME COMFORT WARM AIR HEATERS in the past.

*We want to tell you about the agency proposition we have to offer you.
Write us today and let us send full information.*

Our Catalog is ready—Get your copy now.

ST. LOUIS HEATING COMPANY

2400-06 COLEMAN ST.

--

ST. LOUIS, MISSOURI

Why Roesco Furnaces sell and why you should sell them

YOUR customers when buying warm air heaters want mainly real quality heaters that will give good service for many years. When you sell them Roesco Furnaces you sell them what they want.

All materials used in making Roesco Furnaces undergo the strict inspection and supervision of experts, which insures you and us that only those materials which will withstand severe use for a long time will enter into the making of Roesco Furnaces. Our superior method of manufacturing is your guarantee of a warm air heater constructed to give the maximum in service and efficiency. If you want to sell warm air heaters which will not only satisfy your customers but safeguard your reputation as a reliable installer, sell



ROESCO FURNACES

Secure our agency for your territory now.

Write us today and let us tell you all about the many mechanical features which Roesco Furnaces possess.

You will like our sales policy.

Roesco Furnaces are built in a large modern plant manned by skilled workmen. We never, under any condition, allow an imperfect heater to be shipped to our dealers.

There is good business waiting for you if you sell Roesco Furnaces.

Each sale nets you a good profit and a satisfied customer.

Why not write us now and be ready to make 1921 your biggest furnace year.

***Let us send you our catalog
and circulars.***

**ROESCH ENAMEL RANGE
COMPANY**

BELLEVILLE, ILLINOIS, U. S. A.





THE wisdom which impels our dealers to continually choose Wise Warm Air Heaters for the furnace sales in their districts is not an unnatural gift but merely knowledge gained by experience in selling Wise Warm Air Heaters.

They have learned that it is good business to continue selling Wise Furnaces, heaters that contain practical features which save fuel, labor and upkeep expense for their customers.

It has always been our aim to produce the best furnace possible, to keep up our high standard of quality at all times so that the public and our dealers could always place the utmost confidence in the operation and durability of Wise Warm Air Heaters.



THE technical data which explain in detail how Wise Furnaces are made and what they are made of make interesting reading. The illustrated explanations of the many features of construction which have made Wise Furnaces big sellers for over sixteen years are also of interest to dealers who desire to know the reasons why these quality heaters have such unusually well satisfied users.

Our latest catalog contains all this information. It is yours for the asking.

Let us send you your copy now together with our agency proposition.

**WISE FURNACE
COMPANY
AKRON, OHIO**

EVERY
FEATURE
TIME-
TRIED

THEY
SATISFY
EVERY
USER



SCHEIBLE

WARM AIR HEATERS

THE one big thing that causes our dealers to sign up for Scheible Heaters regularly each year is the fact that in previous years they have received not only good profits from their sales but furnaces that always proved to be of uniform good quality.

The all-around goodness and serviceableness of Scheible Heaters have constantly meant for them the up-building of their businesses.

For over thirty years our dealers have successfully sold Scheible Heaters on this purely quality basis and the confidence they place in them is always merited because of the unusually good service they give the user.

While the Scheible Heaters continue to retain their old-fashioned good quality and soundness of construction they contain such features that time and scientific engineering have proved to be real improvements in warm air heater building.

We will be pleased at any time to tell you more about Scheible Heaters and the advantages of the agency for their sales in your territory.

You are no doubt right now figuring on your furnace business for 1921.

Let us send you full Scheible information now.

*A request for our catalog brings it to you promptly.
Write today.*

GET OUR
AGENCY
FOR
1921

SCHEIBLE-MONCRIEF HEATER COMPANY

1444 West Ninth Street
CLEVELAND, OHIO

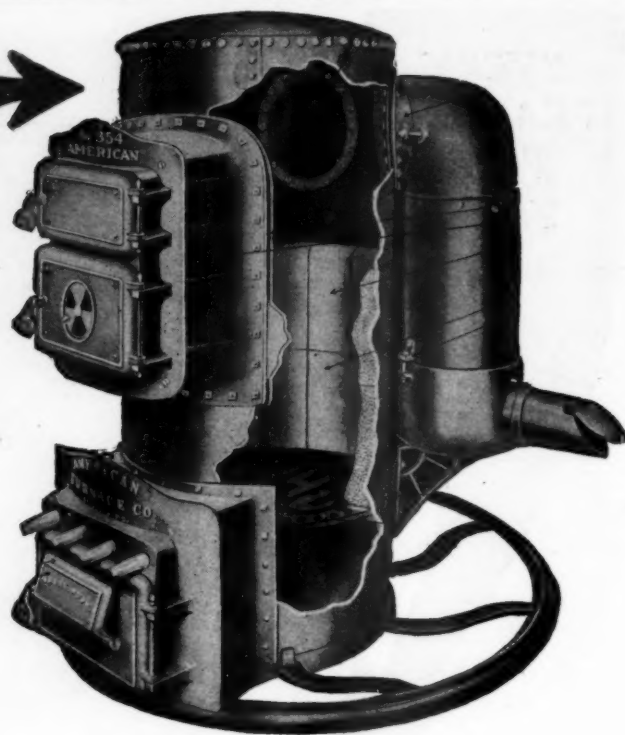
WRITE
TODAY
FOR OUR
CATALOG



It is riveted and calked like a power boiler—

It has the same unequalled strength and durability—

It is as unbreakable and free from the possibility of cracking



AMERICAN BOILER PLATE WARM AIR HEATER

THIS is the heater of heaters. It instantly stands out front in the field because of its many exceptionally attractive and distinctive features. Notice a few of these selling points that are strong enough to convince the most discriminating buyer.

The all-steel construction eliminates cement-packed joints, thereby insuring the user of *clean* warm air. Steel construction guarantees your customers against the possibility of having the heater *crack*. The fire pot is lined with the best grade of sectional fire brick, the same kind of fire brick used in cupolas in which *cast iron is melted*.

There are many more features, points of merit, which you as an experienced heating contractor will recognize at once. We want to send you the full details on the AMERICAN BOILER PLATE WARM AIR HEATER so that you can see for yourself exactly why this heater has been a profitable and successful seller for many dealers for many years.

WE GIVE YOU PRACTICAL ASSISTANCE IN SELLING OUR ENTIRE LINE

We have a very successful method of helping our dealers secure the bulk of the business in their territories. Let us explain our method to you. Let us tell you why the agency for our line will bring you more business and more profits.

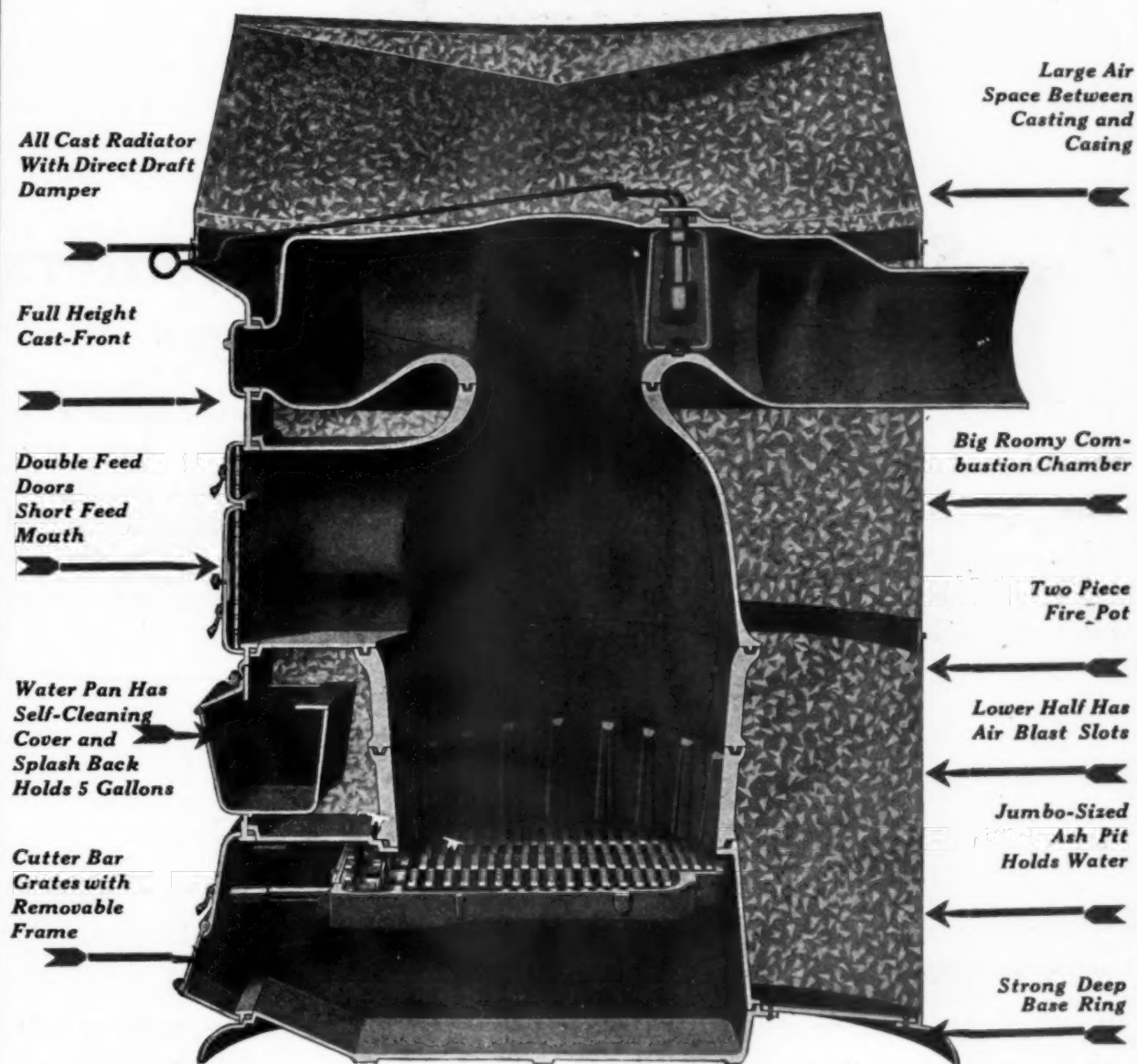
AMERICAN FURNACE CO.

2719 to 2731 Morgan Street
ST. LOUIS - MISSOURI



The **BLACK DIAMOND** **MOIST WARM AIR FURNACE**

**Built on Knowledge Derived From Experience
The Last Work on Furnace Construction**



Weight Properly Distributed to Equalize the Strain
Air Spaces Scientifically Proportioned, Insuring Perfect Circulation

The Giant of Heating Power

The Master of Fuel Economy

Full of Attractive Selling Features

.IF YOU ARE A REAL LIVE DEALER WRITE US TODAY FOR OUR PROPOSITION

THE BLACK DIAMOND FURNACE CO., Monmouth, Ill.



This Series of Extra Heavy Heaters has many exclusive advantages

Their massiveness and durability make them exceptionally powerful heaters.

We recommend them especially for those customers of yours who desire warm air heaters that are strictly high grade and reliable in all respects.

The Niagara heaters are constructed of the best material. They have extra large feed doors and large radiating surface. The fire pot is unusually deep and is made in two sections. All joints are deep cup joints, accurately fitted, making them dust and gas proof.

NIAGARA

WARM AIR HEATERS

We have an illustrated catalog which explains all the details of construction. We would be pleased to send you a copy of it.

If you are interested in selling this up-to-date line of warm air heaters, write us today and allow us to make an agency offer to you.

Our many years of successful warm air heater manufacturing experience is your guarantee of satisfaction.

Write for that catalog now

FOREST CITY FOUNDRY & MFG. COMPANY
CLEVELAND, OHIO

To Serve You Better

We are centralizing and consolidating all of our production in a

BIG COMPLETE NEW WORKS

including foundry, factory, sheet metal shop, assembly plant and extensive warehouses, located at

SYCAMORE, ILL.

By this new arrangement in the manufacturing of

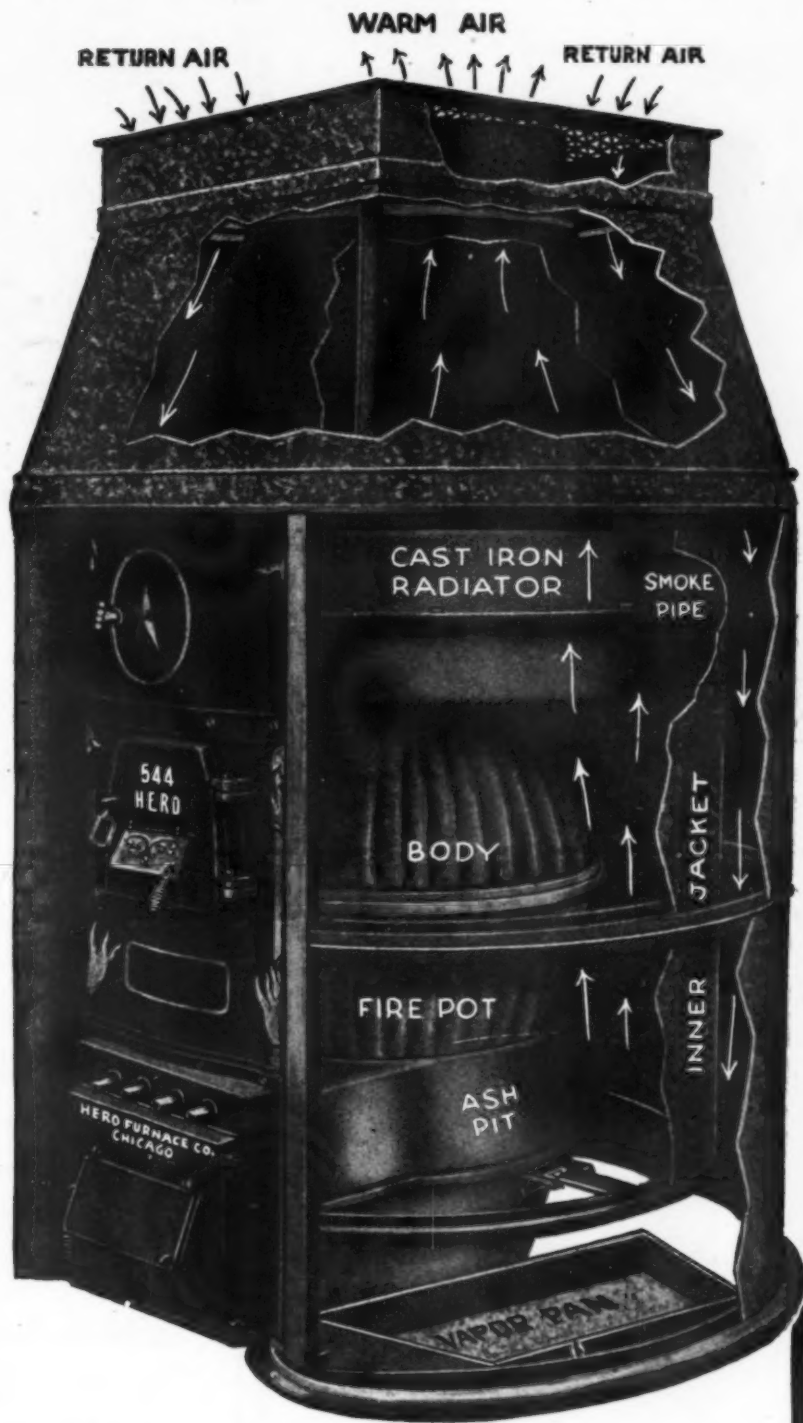
HERO FURNACES

HERO PIPELESS FURNACES

HERO SCHOOL ROOM HEATERS

HOT WATER HEATERS

Our past good service will be greatly improved. LET US PROVE IT TO YOU.



The HERO growth is substantial, hardy and steady.

The HERO Line is reliable, is established, is known, is EASY TO SELL.

The HERO SELLING PLAN gets the business.

Write us, asking for our PLAN, PRICES and Printed Matter.

HERO FURNACE COMPANY

57 West Lake Street

CHICAGO, ILLINOIS

FLORAL CITY QUEEN FURNACE



THE illustration at the left shows our New Queen Furnace with direct draft outlet from radiator to smoke pipe. This is the only furnace of this type on the market with a real direct draft—and the best proportioned furnace made. It has a large one-piece radiator, large fire door with air blast inlet and slotted fire-pot. We have a folder which describes this wonderful new furnace in detail. Write for a copy today. Our dealers make good profits and enjoy real selling cooperation from us.

Write for dealer information now.

DEFENDER PIPELESS FURNACE



THIS is a real pipeless furnace and we highly recommend it. It is well built, heavy, and is made with a one piece all cast radiator. It has properly proportioned warm and cold air areas and will do all that we claim for it.

You can satisfy your customers with this successful pipeless furnace. It is an unusually good, reliable heater and it sells at a fair price.

Let us send you our complete catalog illustrating and describing our entire line of quality warm air heaters.

MONROE FOUNDRY & FURNACE CO.
MONROE, MICHIGAN



ALL STEEL
WILL NOT CRACK
—
PIPE AND
PIPELESS
—
DOUBLE
SECTIONAL
CASING
—
QUICK
RADIATING
—
NON-LEAKABLE
RIVETED JOINTS

EXTRA DOUBLE
RADIATOR
—
REVOLVING
GRATE
—
LARGE
HEATING
SURFACE
—
FIRE BRICK
FIRE POT
—
NOTICE THE
HOT BLAST PLATE

VICTOR

STEEL

WARM AIR HEATER

TAKE another look at the illustration above, read over the list of features again and ask yourself if the VICTOR STEEL FURNACE isn't the most durably and efficiently constructed warm air heater on the market.

Steel is the logical metal for warm air heating. It radiates heat quicker, it cannot crack like cast iron and the riveted or welded joints eliminate leaking and insure your customers of clean, warm air.

The VICTOR STEEL HEATER is very simple in construction, it has few parts and it gives many years of the most economical and efficient heating service. The demand for the VICTOR has grown year after year until we were forced to build a large, new and modern factory in order to keep pace with our growing business.

We want you to analyze all of the many features of the VICTOR STEEL WARM AIR HEATER. The best way for you to do this is to send for our illustrated, descriptive catalog and then get a sample on your floor. Our agency for your territory will bring you what it is bringing our many other dealers—Good Profits, Increased Business and customers who will remain satisfied with their purchase for many long years.

Write for our catalog today.

NEAL'S PATENT REGISTER SHIELDS

Here's a good selling article for you. Every furnace owner is a good prospect and you can sell some with every installation.

It protects the walls from streaking and it has a pocket that catches the dust. It distributes the warm air over the room. The little water pans enable your customers to regulate the humidity of the air in the rooms. Write for circulars and prices.

WRITE FOR COMPLETE CATALOG TODAY.



HALL-NEAL FURNACE CO.
1322-24-26 N. CAPITOL AVENUE, INDIANAPOLIS, INDIANA

THINGS that are well made, things that are conscientiously constructed to fulfill the purposes for which they were designed, endure.

A warm air heater not only must be composed of high quality materials but must be also skillfully and accurately designed and built.

This is one of the many uncommon good qualities of the Beaver One-Pipe Warm Air Heater.

It is one of the numerous reasons why the thousands of Beaver One-Pipe users view their investments with utmost approval.

It is but one of the various sound selling features that bring many sales and desirable profits to our dealers.

You of course are interested in selling such a warm air heater.

We ask you to write us for more information, for complete details covering construction, prices and the agency for your territory.



BEAVER

ONE-PIPE

Warm Air Heater

"The One That Works So Well"

DANVILLE STOVE & MFG. CO.

DANVILLE, PENNSYLVANIA

CHICAGO, ILL.

W. D. Sager, 330-340 No. Water St.

PITTSBURGH, PA.

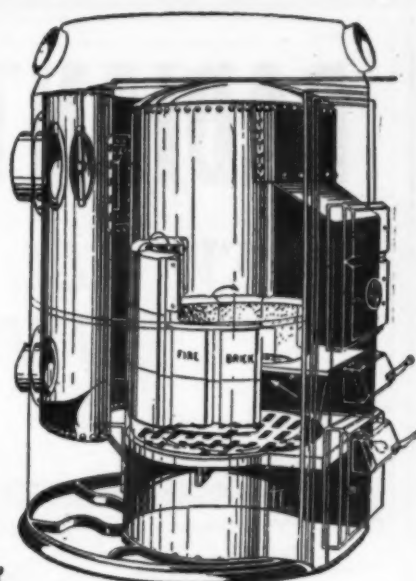
R. E. Edmunds, 104 Wood St.

Truly the PEERLESS Line

NO other line offers the dealer so great an opportunity for giving his customers the best that their money will buy. The PEERLESS LINE of warm air heaters contains more sound features of construction than any other line on the market.

All our heaters (except the All Cast) are made of GENUINE ARMCO INGOT IRON. All seams are riveted so that there are no seams to be packed with cement.

ARMCO IRON is made to last. It is the most durable material that we could use in building our furnaces. It resists rust and will withstand the greatest heat.



Our Engineering Department

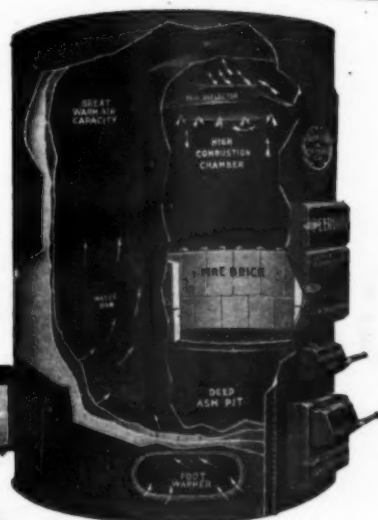
We co-operate with our dealers to the fullest extent. We maintain a fully equipped Engineering Department for preparing full details, plans and estimates. We will assist you on any style of heating system. Submit to us plans or sketch of building, including basement, giving size and location of chimneys, distance between joists, size of girders, piers, etc. It is necessary to have complete information in order to give you accurate assistance.

THIS SERVICE IS FREE — USE IT

Write today for illustrated catalogs and circulars.

We would be pleased to mail you our complete literature which describes each heater of our line in full detail.

Get this descriptive matter now and learn about the many exclusive PEERLESS FEATURES.



NOTICE the FIRE BRICK fire pot used in PEERLESS ARMCO IRON FURNACES. This is the same kind of brick that is used in boilers and cupolas and will stand an enormous degree of heat. STEEL AND CAST IRON (OF WHICH OTHER FURNACES ARE MADE) CAN BE MELTED IN A FURNACE LINED WITH THESE BRICKS.

The fire pot on any furnace is usually the greatest expense in case it has to be replaced. With the PEERLESS ARMCO IRON FURNACE your customers receive not only the strongest fire pot constructed but the least expensive in case the fire brick needs to be replaced.

We offer the dealer an attractive co-operative selling agency plan. We want to tell you all about it.

Why not let us write you in detail about our PEERLESS HEATERS and how you can sell them with profit?

Send us a note today and be one among the hundreds of new PEERLESS dealers for 1921.



PEERLESS FOUNDRY CO.

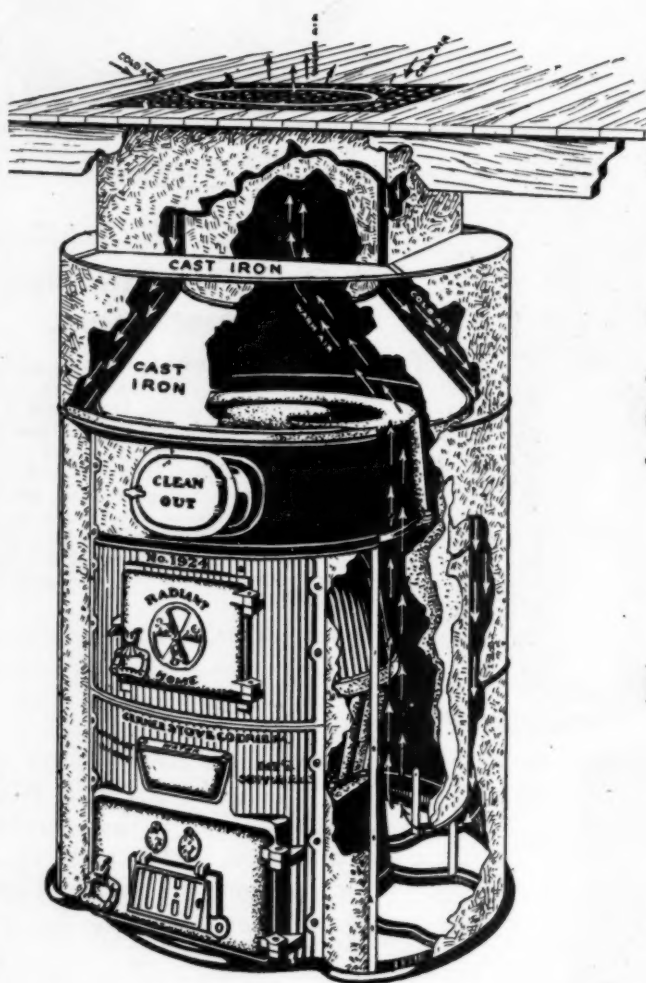
Manufacturers Warm Air Heaters, Duplex Registers and Furnace Fittings

1853-1955 Ludlow Avenue

INDIANAPOLIS, INDIANA

RADIANT-HOME FURNACES

NEW ALL CAST SINGLE REGISTER PIPELESS FURNACE



Made in two styles
INSIDE AND OUTSIDE CASING TOPS
CAST IRON
EXTRA LARGE SIZE PORCELAIN IRON
REGISTER

Furnace Put Up in Only Five Packages
for Shipment—Most Compact
OCCUPIES LESS CUBIC FEET of SPACE

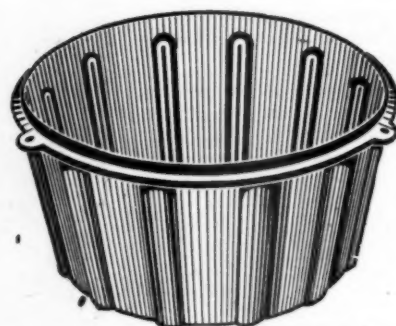
Guaranteed the Best

CELEBRATED PATENTED
RADIANT-HOME AIR BLAST
FIRE POT

Produces 17% More Heat Units
Than Any Other Type of
Air Blast Fire Pot
on the Market

EASY TO INSTALL

**GUARANTEED
TO EXCEL ALL OTHERS**



COMPLETE COMBUSTION
WITH ALL FUELS

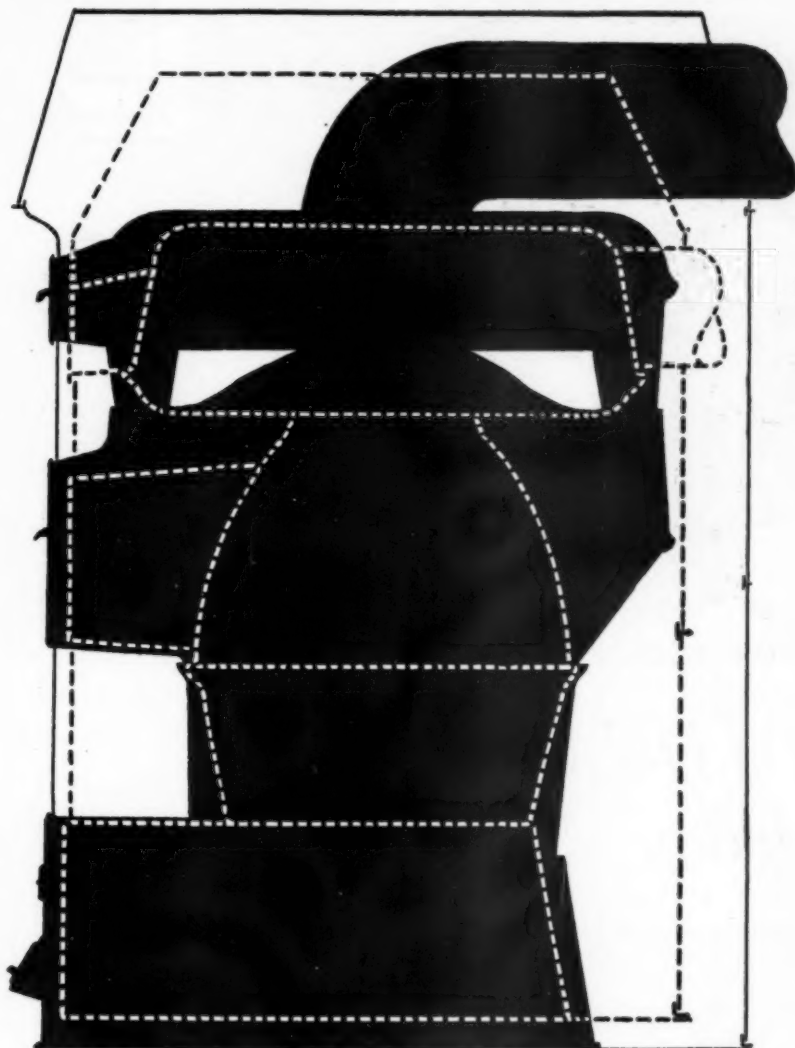
GERMER STOVE COMPANY

LARGEST MANUFACTURERS OF
STRICTLY HIGH GRADE STOVES, RANGES AND FURNACES

ERIE, PA.

364 River St., CHICAGO, ILL.

A COMPARISON OF TYPES



ABOUT 90% of all furnaces made follow one general design, generally known as the stove type because they follow the general lines of the old-fashioned cannon stove.

MARSHALL WOLVERINE FURNACES are a radical departure from this stove type and the illustrations show the difference between the stove type furnace and the MARSHALL WOLVERINE SUPERHEATER. This is no criticism of any make of furnace but simply a comparison of types to show the difference of the MARSHALL WOLVERINE type of construction.

The illustration on the left is drawn from actual measurements so you can see how much the MARSHALL WOLVERINE SUPERHEATER sticks out on all sides beyond the other; the MARSHALL WOLVERINE SUPERHEATER is shown in solid black, the other in dotted lines.

ALL of the solid black portion that extends out beyond the dotted lines is extra radiating surface that the MARSHALL WOLVERINE SUPERHEATER has that the other has not. This extra radiating surface is valuable to the user because it means quicker and more abundant heat at a smaller fuel expense.

Notice, too, that while the tops of the firepot are the same, that the bottoms of the grate surface are not, that the stove type furnace has a grate surface that is two inches smaller in diameter than the other and that while the MARSHALL WOLVERINE SUPERHEATER has 452 square inches of grate surface the other furnace has only 314 square inches, a difference of 138 square inches or better than 42% less. In other words, the stove type furnace is not as efficient as the MARSHALL WOLVERINE SUPERHEATER by 42%, because the grate surface is what governs the heating power of a furnace, not firepot diameter.

Mr. Dealer or Jobber—This celebrated MARSHALL WOLVERINE SUPERHEATER costs you no more than the ordinary type. Write today for prices and exclusive agency.

PIPE or PIPELESS

MARSHALL FURNACE CO.
MARSHALL MICHIGAN



*More than 100,000
are in use today*

THE ever increasing number of LENNOX TORRID ZONE STEEL FURNACES in use is due, when thoroughly analyzed, to their superior and unfailing ability to comfortably heat homes.

Our able selling force and our progressive policies *help*—Our modern plant and our excellent manufacturing facilities *help*—Our dealers—all progressive and experienced heating contractors—*help*.

But —the steady growth of TORRID ZONE favor from the public is being won year after year only by offering furnaces that are always above the standard in quality.

This is what our past experience has taught us—over twenty-five years of success in steel furnace building—and we still think this same policy could not be improved upon.

If you believe that this is a good and profitable way to do business we would be glad to write you personally giving full information concerning our agency for your territory.

Write today for our new catalog and dealer proposition



THE LENNOX FURNACE CO.
200 Lincoln Highway, Marshalltown, Ia.

APPROVED BY



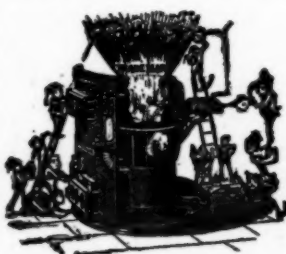
The Furnace
with the
**THREE-WAY
AIR BLAST**



Each sale of an Ath-A-Nor Furnace carries with it an unusually great feeling of confidence on the part of both the dealer and the customer. When you close a contract to install an Ath-A-Nor you know that your customer will get the highest quality and Perfect Heating.

You will satisfy every customer because the Ath-A-Nor has features of construction which make it an exceptionally durable and economical warm air heater. The PATENTED THREE-WAY AIR BLAST is an exclusive feature which makes the Ath-A-Nor Furnace the most efficient and economical user of fuel of any heater on the market. Both the Ath-A-Nor Pipe and the Ath-A-Nor Pipeless contain a soundness of construction and an accuracy of heating design not found in any other warm air heaters in the field.

Our Trade Mark—that for over



**50
years**

has represented the highest quality in Warm Air Heater construction. In selling Ath-A-Nor Warm Air Heaters you sell furnaces which are made by an organization having over half a century of successful warm air heater manufacturing experience. This is your guarantee that they will make good.

Let us send you Agency Details NOW

The Ath-A-Nor agency for your territory will bring you good profits. If Ath-A-Nor Furnaces are not already represented in your district we can offer you an attractive proposition for 1921. Write for full particulars today.

**THE
MAY-FIEBEGER FURNACE CO.**

(The Athanor People)

NEWARK, OHIO

DISTRIBUTORS:

The Kelly-How-Thomson Company, Duluth, Minn.
Excelsior Heating Supply Company, Kansas City, Mo.

**SELF
CLEANING**



**SUPER
HEATING**

Pipeless Furnace

FOR the dealer who is interested in selling a pipeless furnace containing not only selling features but efficient heating features, the A-B Pipeless Furnace presents an unequaled and profitable opportunity. If you will send us your name we will be glad to forward complete information regarding the construction of the A-B Pipeless Furnace and the details concerning our exclusive agency for your territory.

A-B Pipeless Furnace dealers are given Selling Cooperation that is complete in every way. Our dealer advertising campaign is one of the best ever prepared. It is pulling large sales and profits for A-B dealers who are now using it. It can do the same for you. Let us show you how we help our dealers sell A-B Pipeless Furnaces.

WRITE FOR DETAILS TODAY

A-B STOVE COMPANY
BATTLE CREEK, MICH.

COLD AIR WARM AIR COLD AIR





ATTENTION FURNACE DEALERS

The new line of **TAPLIN HOT BLAST HEATERS** is ready for the market.

This line of heaters is manufactured by men having over thirty years' experience in the business, and is comprised of five sizes ranging from 18" firepots with 16" grates to 32" firepots with 30" grates.

Pipe Heaters made in 18", 21", 24", 27" and 32".

Onepipe heaters made in 18", 21" and 24".

Triplex Heaters made in 18", 21", 24", 27" and 32".

SPECIAL FEATURES

One piece countersunk base, one piece ash pit.

Plenty of room under grates for shovel.

Patented anti-clinker grate, shakes with one motion while standing upright.

Full flush fronts, large feed doors with patented heat proof handles.

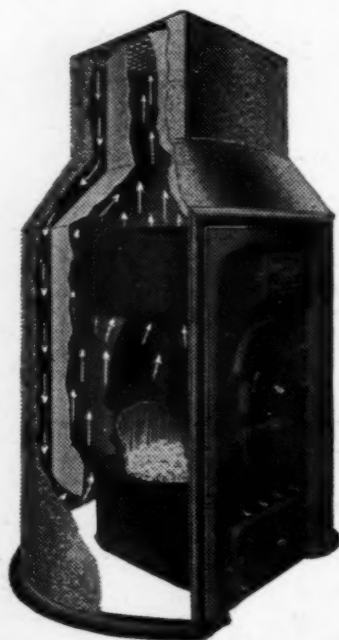
Smoke neck and clean out extending thru casing.

HOT BLAST FEATURE DELIVERING THE PROPER VOLUME OF HEATED AIR AT SURFACE OF FIRE, REGARDLESS OF RATE OF COMBUSTION.

"Sells wherever shown".

For special catalog, prices and dealer's proposition, write

TAPLIN FURNACE CO., GRAND RAPIDS, MICH.



PEERLESS GRAVITY PIPELESS HEATER

A NEW improved furnace built as good as it looks, simple and yet complete in every detail. Made for Western trade and Western fuels.

The price is consistent and deliveries prompt. The right furnace for you.

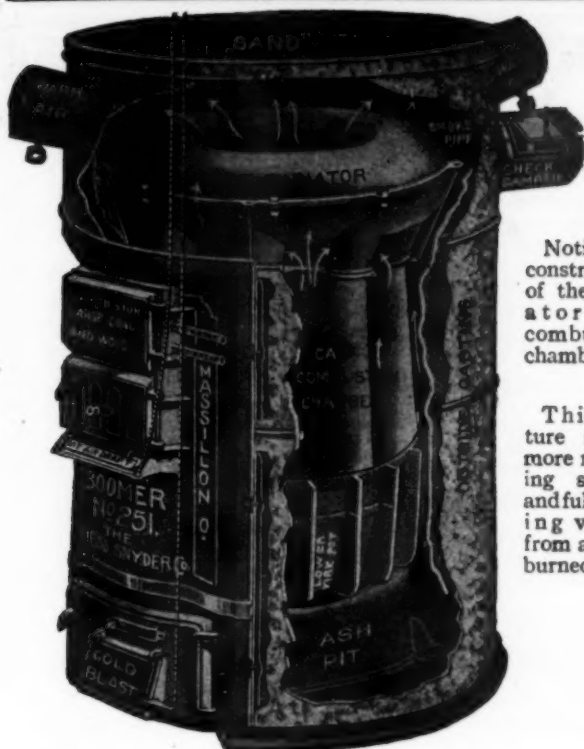
"THE STANDARD PEOPLE SELL STANDARD GOODS"

A line from you will bring our catalogue.

STANDARD FURNACE & SUPPLY CO.

407-13 South 10th Street

OMAHA, NEBRASKA



Notice the construction of the radiator and combustion chamber.

This feature means more radiating surface and full heating value from all fuel burned.

BOOMER

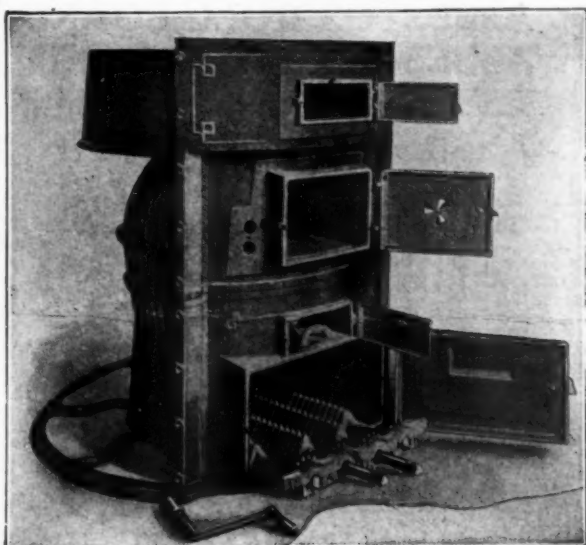
furnaces have been successfully made and sold for over 36 years. They have other good features that help dealers make sales. **BOOMER DEALERS** get real cooperation from us. *Write today for our latest catalog and let us tell you all about it.*

THE HESS-SNYDER COMPANY
MASSILLON, OHIO

The "BILT-RITE" Series

High Grade Efficient Heaters

PIPE AND PIPELESS

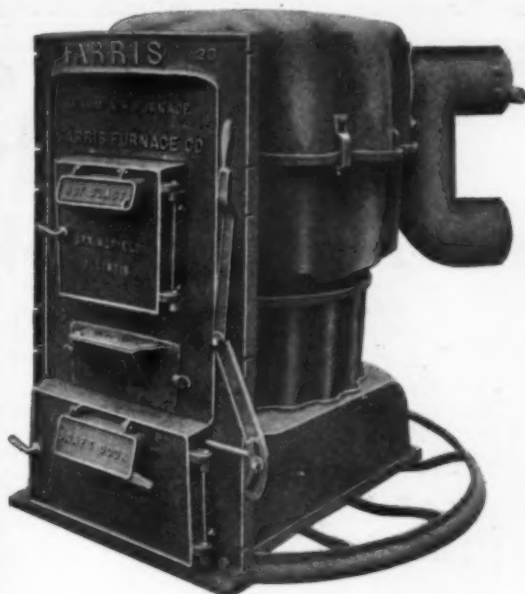


YOU can get the orders for high class heaters with this line and there is a size for every need, Pipe and Pipeless.

Write us now for full particulars. Let us tell you more about our high quality line and the profits and satisfied customers it can bring you.

*Ask about our agency for your territory
Write for illustrated circular today*

THE HAMMOND HEATING CO.
110 East 2nd Street CINCINNATI, OHIO



FARRIS FURNACE

WHY IT MAKES GOOD

Economy of Fuel

All requisites of perfect combustion and radiation are found in the FARRIS—roomy combustion chamber, pre-heated draft over the fire, corrugated self-cleaning dome.

Air-tight Construction

The merest tyro knows the importance of tight doors, none can fail to appreciate the superiority of the FARRIS in perfect control through air-tight construction.

Gas-proof Construction

The FARRIS method of door construction prohibits leakage of gas into the warm-air casing.

Ease of Operation

A moment's study of the motions involved in tending the FARRIS reveals that simplicity and comfort have been attained.

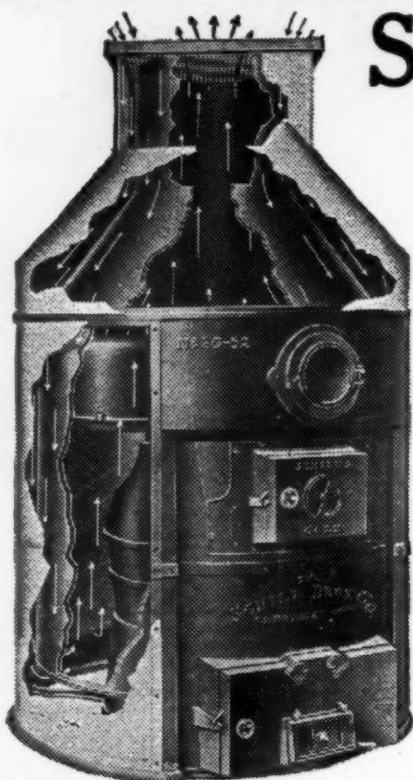
Stability

The sturdy strength of the FARRIS will be more and more appreciated by your customers as the seasons roll. You will recruit an ever increasing army of boosters who swear by their FARRIS.

These and other features are explained in detail in our catalog, and our representative can tell you more about how and why FARRIS installations give permanent satisfaction.

FARRIS FURNACE CO.
SPRINGFIELD, ILLINOIS

DEALERS—Write today for details on



SCHILL'S PIPELESS Warm Air Heater

This new idea is really an evolution in heating. Everywhere the popularity of the Pipeless Heater is increasing. You should not fail to get your share of this profitable business. Also you should not fail to handle a **good** Pipeless Heater. **SCHILL'S PIPELESS Warm Air Heater** is of the very best quality. It will burn hard and soft coal or wood. It is just the heater for moderate size homes, bungalows, churches, stores and other buildings. This heater is **guaranteed** so that you can assure your customers of complete satisfaction. Many testimonials from satisfied users testify to its true merit.

Write now for full particulars.

THE SCHILL BROTHERS COMPANY
CRESTLINE, OHIO

RYBOLT

RELIABLE WARM AIR HEATERS

are built to satisfy every user.
They are **reliable**.

The finest tested materials are used in their construction. Only the best workmanship is employed in the making and assembling of each and every part. **RYBOLT WARM AIR HEATERS** are built to last long with severe use. They are, in fact, perfect models of durability. These are only a few of many features that make them good sellers for live dealers.

RYBOLT DEALERS HAVE BIG SALES

The **RYBOLT AGENCY PROPOSITION** is unusually attractive. If you are seeking a real good warm air heater agency it will pay you to learn the many advantages that the **RYBOLT DEALER** enjoys.

Perhaps the **RYBOLT AGENCY** for your territory is still open. If it is we will be glad to write you regarding an exclusive territory.

Let us send you complete literature that explains the details of **RYBOLT RELIABLE WARM AIR HEATERS**.

WRITE TODAY FOR ILLUSTRATED CIRCULARS

THE RYBOLT HEATER CO.
ASHLAND, OHIO

BRANCHES

Cincinnati, Ohio

Indianapolis, Ind.

Akron, Ohio

ASBESTOS

ASBESTOS PAPER
ASBESTOS ROLL BOARD
ASBESTOS MILL BOARD
ASBESTOS PIPE COVERING
ASBESTOS FURNACE
CEMENT

ASBESTOS
CORRUGATED PAPER

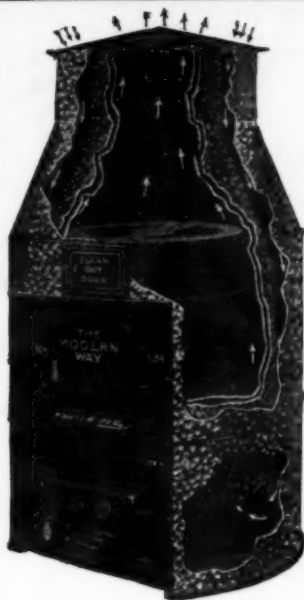
ASBESTOS
CEMENT

ASBESTOS PRODUCTS CO.

Consumers Building

220 So. State St.

CHICAGO, ILL.



Sectional View of Pipeless Furnace.

THE NEW MODERN WAY PIPE AND PIPELESS FURNACE

The agency for the NEW MODERN WAY is a positive money maker for you—Here's why. Notice the illustration at the right showing the patented exclusive MODERN WAY fuel saving feature. These air jets REALLY DO deliver pre-heated air to mix with the gas and smoke and they don't clog up. The MODERN WAY is a heavy furnace and an economical user of fuel.

Its construction is simple, fool proof and it has few parts—this saves you time in installing.

The MODERN WAY is a strictly high grade furnace in all respects—one that will positively satisfy your customers.

Write today for catalog and agency particulars

THE MODERN WAY FURNACE CO.
FORT WAYNE, INDIANA



Sectional View of Straight Firepot and Patented Air Jets

Furnace Salesmen Wanted

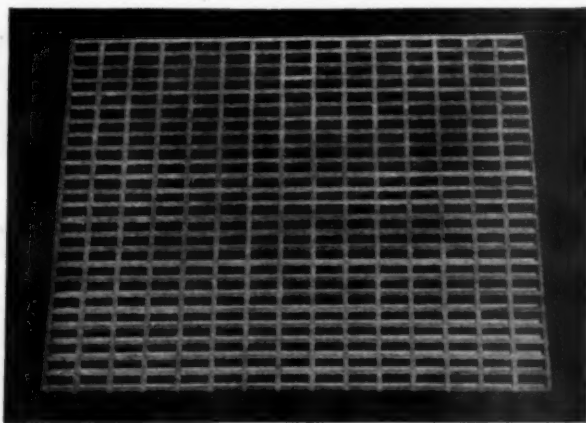
We have several openings for thoroughly practical and high-grade furnace salesmen to sell the new

TITAN PIPE AND PIPELESS FURNACES

We are manufacturing an all cast iron furnace in full run of sizes with all the latest achievements in construction.

Please state salary desired together with experience and references.

Standard Foundry & Mfg. Co.
DE KALB, ILLINOIS



AMERICAN WOOD REGISTERS

Our Quality is the Standard

Every detail carefully inspected before shipments leave our factories.

Best of materials and workmanship at all times. Standard sizes carried in stock for Express or Parcel Post shipments.

Now is the time to place your orders for stock requirements to be made during the dull season, delivery when wanted.

Write at once for prices and state your requirements.

THE AMERICAN WOOD REGISTER CO.
PLYMOUTH, INDIANA

20%

LESS FUEL BURNED

This device attached to a Furnace causes all SOOT and GAS to be consumed.

This means more heat for your customers. It means the elimination of SOOT troubles. It is easy to install and can be used on all types of furnaces. Every sale nets you a good profit.



THE Z. T. SOOT AND GAS CONSUMER

The most simple and efficient device of its kind on the market. Let us send you our complete illustrated booklet. Write for it today.

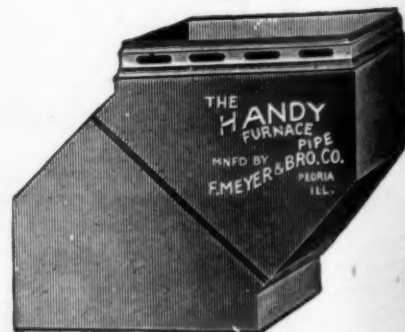
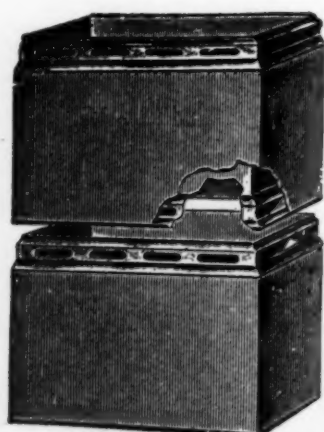
THE Z. T. SOOT and GAS CONSUMER CO., 346 Main St., OSHKOSH, WIS.



We Manufacture
"HANDY" FURNACE PIPE
in Quantities to Meet an
Ever Increasing Demand

It is **HANDY** to get (our jobbers are scattered all over the map) and it is **HANDY** to work with. Any workman will accomplish a maximum of productive labor with **HANDY PIPE**.

F. Meyer &
Peoria,





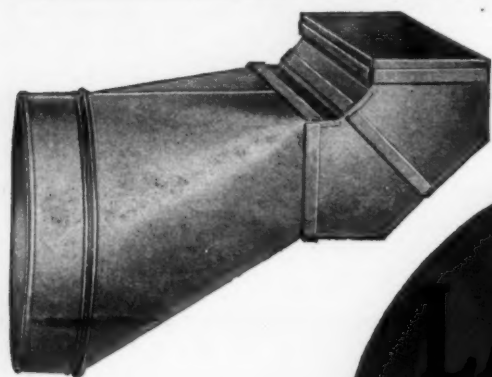
We Are Distributors of "Everything Needed in the Installation of Warm Air Furnaces"

That is our motto, and we surely live up to it. You will find that this big Furnace Supply House is admirably equipped and qualified to take care of **ALL** your needs.

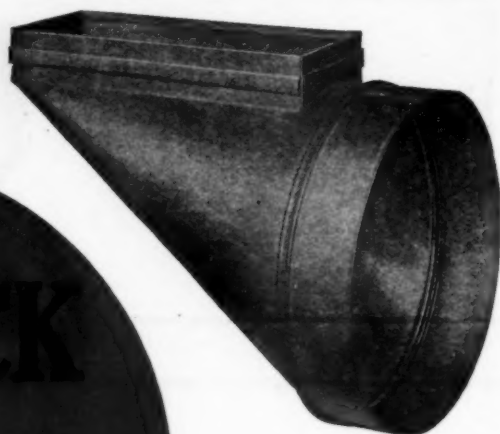
Brother Co.

Illinois





No. 010 Boot.
Frictionless
Straight-Way
Boot.



No. 04 Boot.
"Bull's Eye"
Center Boot.



No. 02 Boot with
4-inch Offset.
"Long Tom"
Boot.



No. 9 Frictionless
Angle-Way Boot.
"Special Deliv-
ery" Double
Boots.

The kind most installers are using

THE tremendous growth of our output is proof that Lamneck Pipe and Fittings are right.

Lamneck Pipe and Fittings will simplify your installations. They are simple and sensible in construction and they cost no more than the ordinary kind.

Write today for our simplified catalog No. 2. It illustrates the whole line, is easy to read and understand, and will fit your pocket so you can take it with you "on the job."

THE W. E. LAMNECK COMPANY

COLUMBUS, OHIO *Central City*

WE carry at all times a complete stock of T & B Registers, Wood Registers, Asbestos Paper, Cast Dampers, Flour Paste, and other supplies for the installer of warm air heaters. Send us your next order for supplies, it will receive prompt attention.

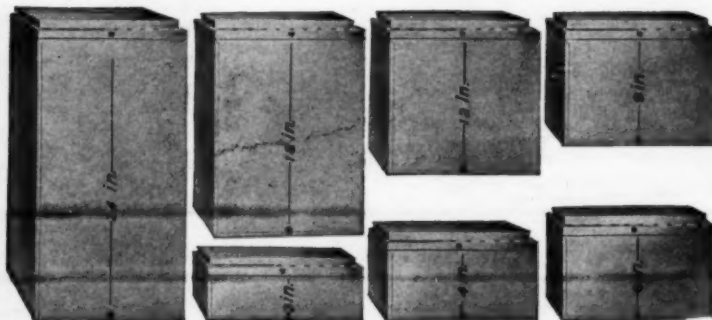


Illustration Shows Complete Range of Size

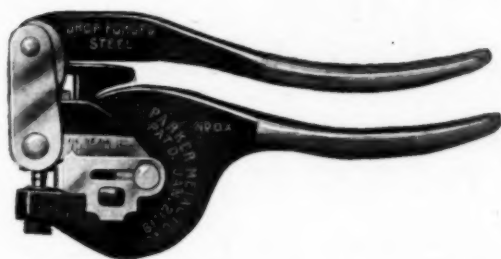
In Chicago
a complete stock of Lamneck Pipe and Fittings is carried by the Central Heating Supply Co., 1125 W. 37th Street.

In Cleveland
Lamneck Pipe and Fittings are sold by J. Kinsner & Son Co., 8710 Blaine Avenue.

These companies can fill your orders at all times.

Facts and figures —not merely sales talk!

The PARKER METAL PUNCH No. O. X.



**Greater Punching Power
than any tool of its size**

COMPACT—Measures only 8 inches

LIGHT——Weighs but 2½ lbs.

POWERFUL—Capacity a 17/32" hole in 16 ga. steel; or equivalent.

Besides the fact that it is made of O. H. Drop forged steel, to withstand rough usage, it has many distinct and exclusive features. Ease and speed in the changing of Punches and Dies; Front Pointer and Side Gauge combination, which eliminates center-punching; and small cost for maintainance.

The PARKER METAL PUNCH No. XX

"Take the Punch to the work, or the work to the Punch"



A combination Bench and Hand Punch of a greater range of work than the No. O. X. Punch.

Constructed on the same principle of applied force, allowing of compactness coupled with greater punching power.

Measures 9" over all.

Weighs about 4½ lbs.

Capacity: A 17/32" hole in 20 gauge steel, or equivalent.

This Tool is fast becoming popular with the trade, and will help to complete your shop equipment.

PARKER HARDENED SHEET METAL SCREWS



Save fully 75% time and labor by their use for joining sheet metal, and making fastenings to metal.

Eliminates in a good many instances the use of Stove Bolts, Tap Bolts and other costly means of operation.

No holes to tap; no nuts to put on.

Just punch or drill a hole in the sheets you intend joining and with a screwdriver turn up flush with the head. You'll have a better fastening in a fraction of the time and labor. Once put in, they stay "put."

There is a Jobber of PARKER PRODUCTS in your territory. If you don't know who they are, your request will bring the information.



PARKER SUPPLY COMPANY, Inc.

Manufacturers of PARKER PRODUCTS

780 East 135th Street

NEW YORK

Furnace Headquarters!

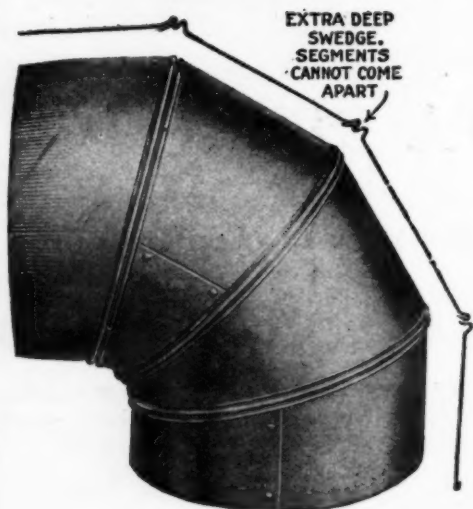
PIPED or PIPELESS



Steel or All-Cast Radiators
One Piece Ribbed
Two Piece Corrugated
or
One Piece Slotted Fire Pots

DUPLEX BALL BEARING GRATES
FLAT or TRIANGULAR GRATES

We Can Furnish Whichever *You*
Prefer from *Chicago* Stock



FURNACE FITTINGS

Single or Double
Tin or Galvanized

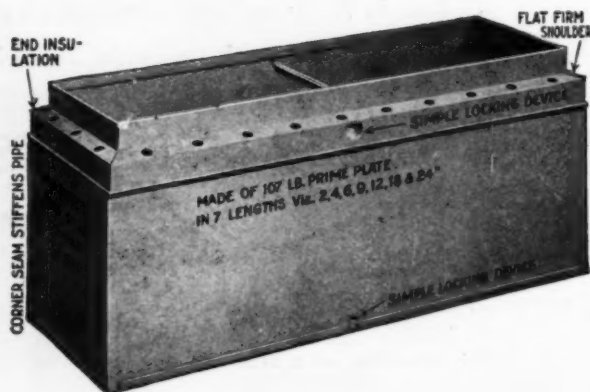
We are *Exclusive Distributors* of

The Famous LAMNECK Line

Also

Majestic Duplex Registers
Floor, Wall and
Baseboard Registers

Wood Faces, Asbestos Paper,
Dampers, Paste and
All Heating Accessories



Get Our Special 1921
Proposition

CENTRAL HEATING SUPPLY CO.

1125-29 W. 37th Street, CHICAGO

"Right On The Tracks" and "Right On The Prices"



FANNER STOVE & FURNACE TRIMMINGS

Below we list a few of our products:

CHAPLETS
STARS—HARD IRON
FURNACE DOOR
HANDLES
COAL SHOVELS
SCRAPERS

STOVE KNOBS
STOVE RINGS
STOVE HANDLES
GRATE SHAKERS
STOVE COVER LIFTERS
POKERS

AS TO

QUALITY AND SERVICE

ASK THE OTHER FELLOW—HE KNOWS

Our latest catalog lists and illustrates a very complete line of finely finished, durable

STOVE TRIMMINGS

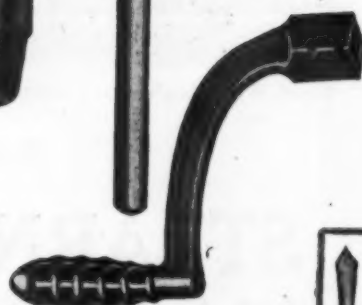
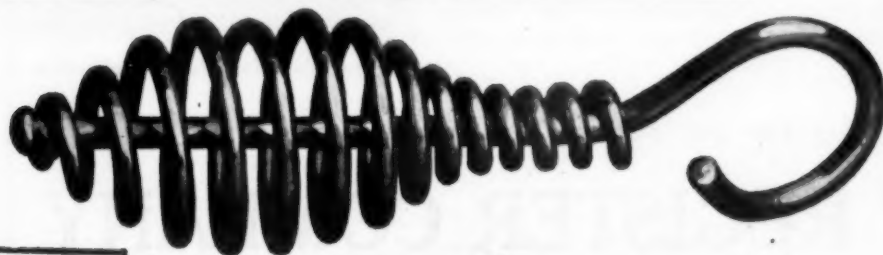
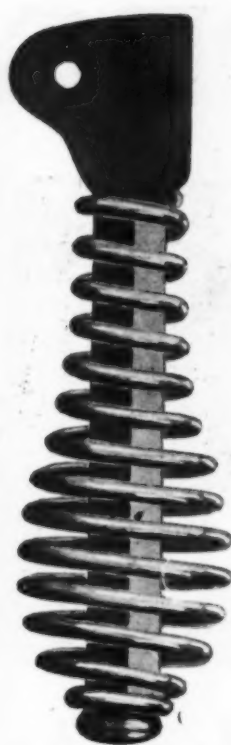
of original distinctive designs.

You should have this catalog on your desk for ready reference. Write today for your copy.

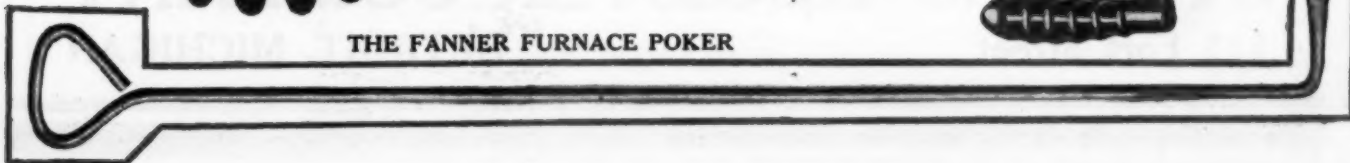
WE OPERATE OUR OWN MALLEABLE AND GRAY IRON FOUNDRIES.

We can give YOU quality and service on your next order. Why not write us for prices now?

**THE FANNER
MANUFACTURING COMPANY**
BROOKSIDE PARK CLEVELAND, OHIO

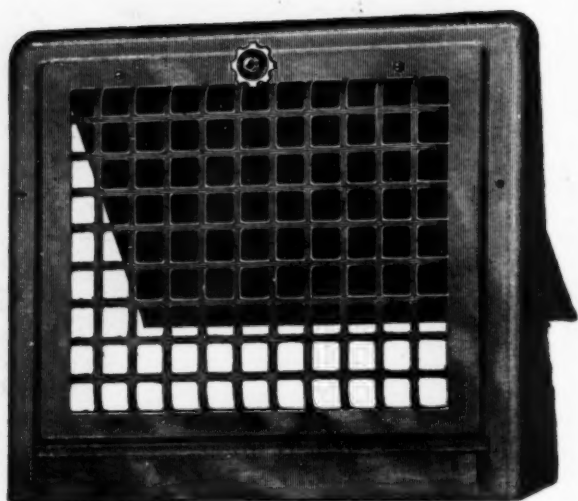


THE FANNER FURNACE POKER



STEARNS'

STEEL BASE AND CONVEX WALL REGISTERS

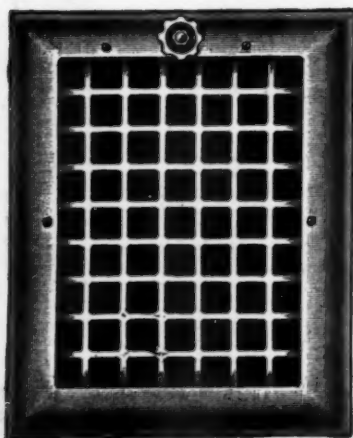


THE fact that STEARNS' STEEL BASE and CONVEX WALL REGISTERS are proving themselves so much superior to others that they are given preference, proves beyond a doubt that they possess real value. Their distinctiveness, reliability and attractiveness have won the praise and endorsement of men capable of judging them.

These Men Are Practical Installers

Their decision should convince you. They are selling STEARNS' STEEL BASE and CONVEX WALL REGISTERS and reaping the profit.

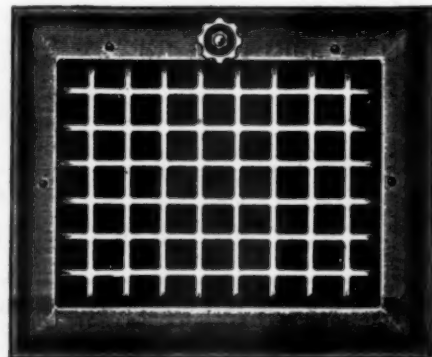
STEARNS' STEEL BASE REGISTERS represent the latest in warm air register construction. They are sturdily built and very highly finished. They give the full capacity, both in the face and box, for the size pipe they are intended for. They are guaranteed against breakage. You can always have the exact size in STEARNS' STEEL BASE REGISTERS as they are furnished in 5 sizes, from 8x10 to 11x13, in black or white japan or electroplated finishes.



Steel Wall Register—Vertical

STEARNS' CONVEX STEEL WALL REGISTERS are neat in design and they also can be had in black or white japan or electroplated finishes, in sizes from 8x10 to 9x12.

Have a stock on hand. Use them on every installation. They will please your customers and give you a good profit.



Steel Wall Register—Horizontal

Write today for our catalog and price list.

STEARNS' REGISTER COMPANY

111 Fort Street

DETROIT, MICHIGAN



I'M TEE BEE

I talk about
hot air
but am not a
hot air talker

WHETHER you believe it or not, my big job is to let the hot air out of hot air heating.

I let it out.

And I keep it in.

Whichever it is, I always register one hundred percent.

Always register, because lining up registers is right in my line.

Mark you, I don't say we make the best registers made, because that's exactly what all the other register fellows kid themselves into believing. What I did say was that nobody makes any better registers; and a lot of folks say, "nobody makes as good."

But be that as it may be, I am going to step right into one of these pages ever and anon and have a regular Tee Bee Register Chat with you.

Which is neither a threat nor a promise, but just a pleasurable anticipation.

TUTTLE & BAILEY MFG CO.

2 W. 45TH STREET

NEW YORK

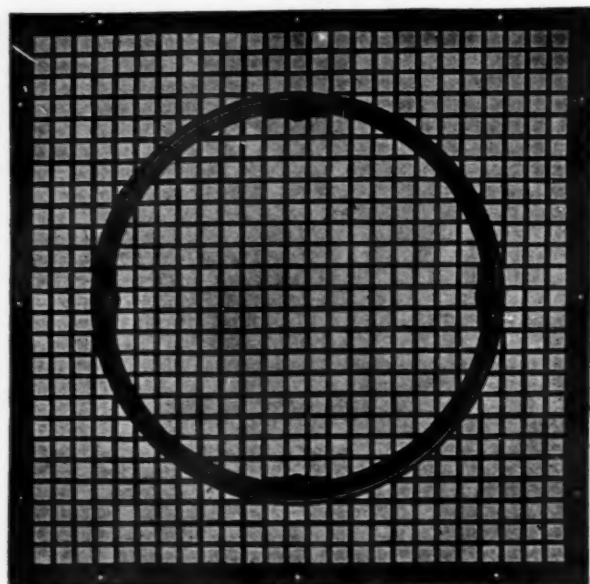
WALWORTH

DOUBLE GRATING

for

PIPELESS FURNACE

PLAIN
LATTICE
DESIGN



NEAT
STRONG
DURABLE

The Kind That Will Please Your Customers

Hundreds of dealers throughout the country are making their installations of Pipeless Furnaces **COMPLETE** by using **WALWORTH DOUBLE GRATINGS**.

They have square cold air return, round center for warm air supply.

They are made in seven standard sizes from 22x24 to 45x45.

We carry a complete stock at all times and are able to fill orders for any quantity promptly.

Let us tell you right now why **WALWORTH DOUBLE GRATINGS** are the best for you to use on your Pipeless Furnace installations.

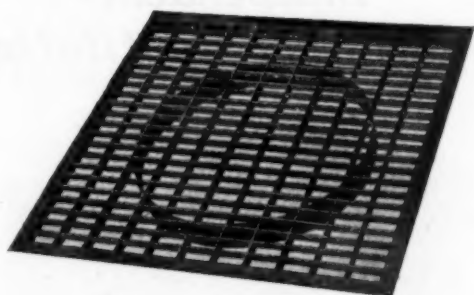
Write Us Today for Catalog and Discount Sheet

WALWORTH RUN FOUNDRY CO.

W. 27th St. and N. Y. C. & St. L. R. R.

Cleveland
Jesse Clay

Independent "Fabrikated" Pipeless Furnace Gratings 82% Open Area



A Revolution In the Method of Manufacturing Pipeless Gratings

The outer frame of angle iron, the grill formed of strip steel one eighth inch wide, all fabricated into squares with openings $\frac{7}{8} \times 1\frac{1}{8}$ inches.

The strips are securely interwoven and frame corners welded.

All sizes of "Fabrikated" Gratings have a uniform open area of 82% comparable with from 50 to 60% usually found in the styles made heretofore.

We Have A Most Inter- esting Story to Tell.

May we send it to you?

Originated and Manufactured by
Independent Register & Mfg. Co.
707 Frankfort Ave., W. CLEVELAND



Independent "Fabrikated" Pipeless Furnace Gratings 82% Open Area

QUALITY Predominates JONES REGISTERS

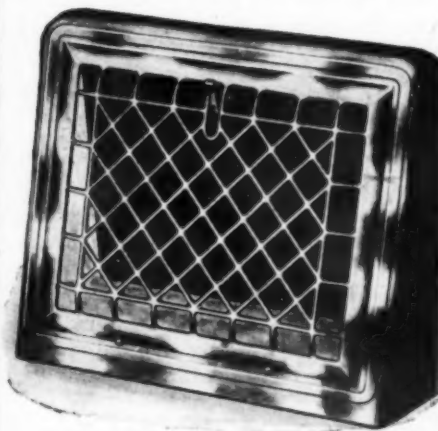
*Cut the
Labor
Expense.*

*A Great
Econo-
mizer of
Basement
Pipe
and
Fittings.*



Each Register complete with box attached

NATIONAL AND INTERNATIONAL } REGISTERS



*A
Pleasing
Design
Different
than
the Rest.*

*Alike in
Appear-
ance.
Let Us
Explain
the
Differ-
ence.*

Our Complete Catalog on Request
Get Our 1921 Prices
REGISTERS OF ALL TYPES
for Pipe or Pipeless.



UNITED STATES REGISTER CO.

MAIN OFFICE
Battle Creek :: :: Mich.

Branch Offices: Minneapolis, Minn.; Kansas City, Mo.;
Denver, Colo.; Des Moines, Ia.; Albany, N. Y.

MARSH WOOD Cold Air Faces



Style 40-C
WOOD FACE
with OBLONG MESH

Durable, Artistic and Economical

MARSH Wood Cold Air Faces are strong, being made of the highest grade selected lumber from our own forests. They match the wood work in homes, thus making their installation attractive, in comparison to any other faces. They are economical, costing less than one-half the price of cast iron or steel registers. On your next job—use MARSH Wood Cold Air Faces.

USE MARSH WOOD FACES FOR PIPELESS INSTALLATIONS

Pipeless installations are successful only when the air has free circulation from room to room. You can make every pipeless job perfect by using MARSH Wood Faces as air circulation registers in the ceiling, above the doors and in the baseboard. MARSH Wood Faces made for this purpose are most practical as they cost less than other ceiling and wall ventilators and look much better.

Our Improved Facilities

No matter what you want in wood faces we can supply you with the highest quality on the market. We have moved into our new plant which gives us three times our former capacity. New special machinery and this added room make it possible for us to meet the ever growing demand for MARSH Wood Faces.

ORDER FROM YOUR JOBBER

All leading jobbers sell MARSH Wood Faces and they can fill your orders promptly. Start now to use more wood faces on your installations. Save money and time and give your customers strong, attractive and economical installations.

*We are the largest manufacturers
of Wood Faces in the world*

Write to your jobber or to us today for catalog and prices

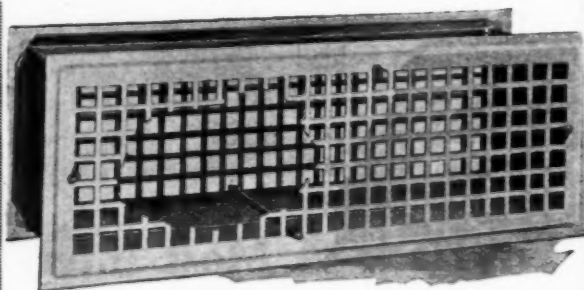
THE MARSH LUMBER CO.
DOVER, OHIO

First Aid to the Pipeless Furnace

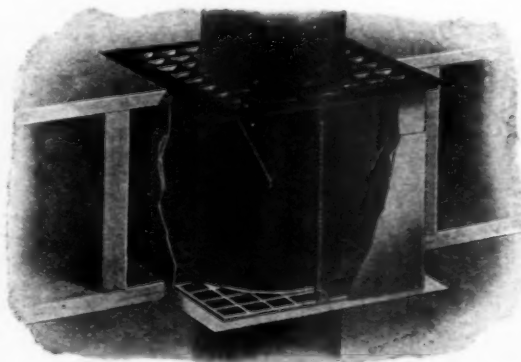
Independent Adjustable Ventilators



For the Ceiling



For the Side Wall



For the Smoke Pipe

There is a booklet awaiting your request.

Independent Register & Mfg. Co.
707 Frankfort Avenue, W. CLEVELAND
Sold by Leading Jobbers

Everything for Furnace Installations

WE offer the Warm Air Heater Installer the most complete **HEATING SUPPLY SERVICE** in this territory.

We handle the best of the leading lines and carry complete stocks at all times.

What are you in need of now for that next job? Write down a list of supplies and tell us to fill the order for you.

Get our prices **TODAY**.

Get our **SERVICE** now and be ready for those rush installation jobs.

REMEMBER

We carry **EVERYTHING** from **FURNACES** down.

Write for Circulars Today.

**THE MANNY HEATING
SUPPLY COMPANY**

131 West Lake Street CHICAGO, ILLINOIS

H&C Registers

Give Satisfaction

Because they excel all others in free air capacity—heat the home more quickly—keep it comfortable and healthful—save coal—are easy to clean—attractive appearance—strong and durable—easy to install, as they meet the different requirements of building construction.

*Please write for information
about the line.*

The Hart & Cooley Co., Inc.


New Britain, Conn.

100 Lafayette St., New York

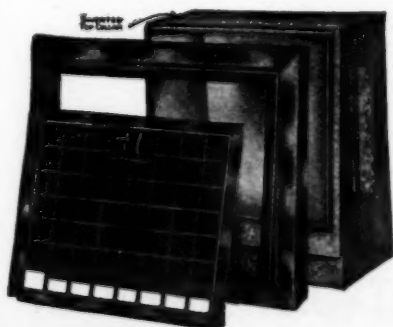
73 E. Lake St., Chicago

LOWER PRICES FOR 1921

Price alone does not measure Satisfaction. It must be backed by High Quality Guaranteed Goods.

The Rock Island  Users are assured of Satisfaction, because they are Buying the **ONLY**

**GUARANTEED REGISTER. IF NOT—
WHY NOT?**



Get our 1921 Proposition before Placing Your Order. Send Coupon to Your Jobber or to us Today.

Rock Island Register Co.

2435 Fifth Ave.

ROCK ISLAND, ILL.

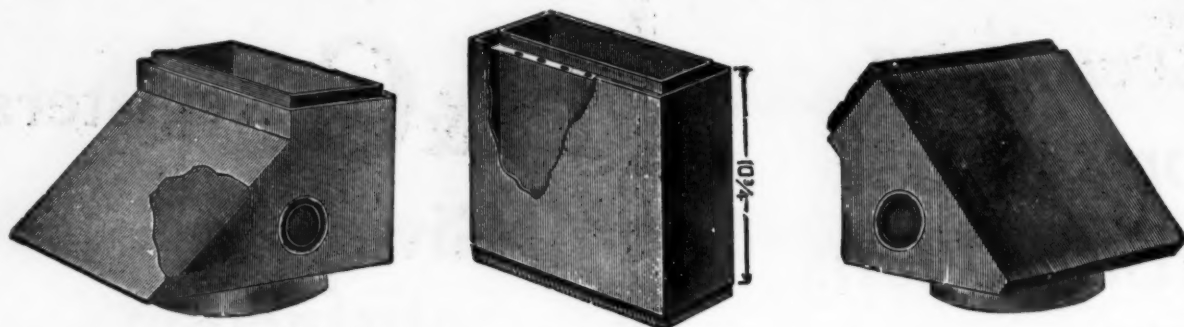
**R. I.
REGISTER
CO.**

Dear Sirs—Mail
Booklet and Prices.

Name

Address

A.A.



*There's a section for every need
and a large stock ready for you in*

MICHIGAN SAFETY FURNACE PIPE

IT makes no difference how hard your warm air heater pipe installations are, it makes no difference how many short turns you have to make in order to get your stacks in, you can do the job quicker, cheaper and better if you use **MICHIGAN SAFETY FURNACE PIPE**.

Our line is complete. There's a section for every need (our catalog illustrates them) and remember, no better **double wall safety furnace pipe** than **MICHIGAN SAFETY FURNACE PIPE** can be had.

Our price list shows you how to save money

Compare our prices and these features of **MICHIGAN SAFETY FURNACE PIPE** with the kind you are now using. The result will be an order from you for your next installation.

1. The air chamber between the inner and outer pipe, maintained by a perforated spacing collar.
2. Short joints which enables the most crooked stack to be made without cutting or destroying the safety features.
3. Every joint and piece fits into the others perfectly which makes the completed stack smooth and straight both inside and outside.
4. **MICHIGAN SAFETY FURNACE PIPE** is made from the best grade of bright tin plate by special machinery. No rivets or solder are used.

A complete stock—Prompt Shipments.

Use **MICHIGAN SAFETY FURNACE PIPE** on your next job. Order your stock from our catalog and get your shipment promptly.

The safety features of **MICHIGAN SAFETY FURNACE PIPE** will appeal to your customers.

*Its costs no more than other kinds and is better.
Why not begin using it now?*

Write today for our catalog and price list.

MICHIGAN SAFETY FURNACE PIPE CO.

113-115 East Fort Street

DETROIT, MICHIGAN

**A Name you can tie to—
A Pipe you can bank on.**



(Trade Mark Reg. U S. Pat Off.)

The Pipe that Outlasts the Furnace

When properly installed it becomes a part of the furnace itself and nothing but an earthquake or a cyclone can jar it loose.

Knox Everlasting Cast Iron Smoke Pipe

in smoke pipes is as Sterling in Silvers.

It is the last word in Smoke Pipes—it's the first word in Safety, Security, Protection, Satisfaction and Profit.

It does away with smoke pipe troubles for all time. It is not affected by soot or corrosion. It does not burn out, fall out, scale or crumble. It is easy to put up as it comes in sections of varying lengths with elbows from 22½ to 90 degrees so that it will fit into almost any space. It nests closely for shipping, making a saving in freight and store room.

It is the biggest business builder ever offered the trade. It is manufactured exclusively by us and is sold through the jobbers and the dealers. A trial order will convince you. Send it to any of the following. Descriptive circulars gladly sent if desired.

WATERLOO REGISTER COMPANY

WATERLOO

IOWA

Manny Heating Supply Co., 131 West Lake St., Chicago
Omaha Stove Repair Works, Omaha, Neb.
Wm. Warnock Company, Sioux City, Iowa
Lincoln Stove Repair Works, Lincoln, Neb.

Leighton Supply Co., Fort Dodge, Iowa
W. C. Teschner, Vincennes, Ind.
Field & Shorb Co., Decatur, Ill.

ANNOUNCEMENT!

TO STOVE AND FURNACE REPAIR DEALERS

Owing to our increasing business in Stove and Furnace Sundries, we now have established for the convenience of our patrons a Supply Department.

We have included in this Department a complete assortment of such items as are usually sold in connection with Stove and Furnace Repairs, together with a line of high-grade Hardware Specialties, Stoves, Heaters and Fire Place Fittings.

We have recently issued for the Trade a Special Catalog covering these different lines, which we will gladly send upon request.

THE NORTHWESTERN STOVE REPAIR CO.

MANUFACTURERS

STOVE and FURNACE REPAIRS

654-666 West Roosevelt Road

CHICAGO



Now YOU can be a Scientific Heating ENGINEER

Don't let that word scientific bother you. It merely means *knowledge of established facts*. Heating and Ventilating Engineering is a BIG field, one of the most important branches of industrial science.

This is the field YOU are in. You install heating and ventilating systems in homes, stores, etc. BUT how about the big jobs? Is your knowledge of this science broad enough to ENGINEER the installation of a heating and ventilating system for a large factory, large school or any other big building which requires a scientific installation.

Know Your Profession Thoroughly—Be an Expert

Contractors, Salesmen and Workmen this is your opportunity to equip yourself with the knowledge that you want, the complete training that will make you a Heating and Ventilating Engineer.

Our Mail Course Makes it Easy for You to Learn

You get thorough practical instruction and you advance as fast as you learn. We teach you individually and successfully. If you desire to become efficient in your field of science—if you want to spend a few hours at home each week in interesting study, we can train you to become a Heating and Ventilating Engineer, competent to handle the biggest and most complicated jobs.

NOW IS THE TIME TO START---WRITE TODAY

Let us send you full details regarding our instruction.

Your name brings you a complete descriptive booklet.

Master these subjects
and land
the big jobs

Heat as an Element; its Properties and Application.
Heat—Generation, Distribution and Losses.
Study of Grates, Stacks and Chimneys.
Study of Hot Air Furnaces, and Their Application.
Study of Fuel Values and Combustion.
Treatise and Study of Ventilation.
Air—Its Properties and Transmission
Study of Air Conditioning and Humidity.
Study and Practice in Specification.
Layouts for Complete Systems.
(These are just a few of the subjects. The course contains 36 major subjects).

THE CLEVELAND ENGINEERING INSTITUTE

8118 Euclid Avenue, CLEVELAND, OHIO

Make \$1500 to \$3000 Extra in 1921 EXPLOIT YOUR BUSINESS FULLY

Find the soft spots with Big Profits and Rapid Turn Overs.

WORK YOURSELF INTO THE SPECIALTY AUTOMOBILE BODY GAME!

There are big profits in it, and it is a business that has come to stay, and will develop more and more.

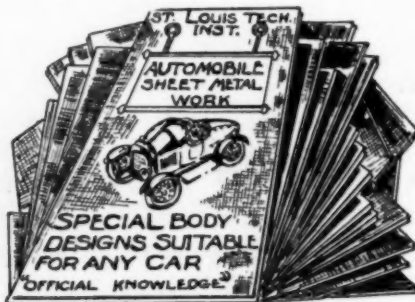
I MADE 5 SPECIAL BODIES in the last few months, since I got your new Drawings, writes a S. M. Employer.

Your new Sheet Metal Automobile Work just fills my bill, as I have been wanting this very thing for a year, and have had special artists make me designs, which was very expensive and your drawings are much more to the point, writes another Employer.

Send No Money
Examine Them Free

More Necessary than Tools,
for by Technical knowledge
tools are made.

Nothing like it
Anywhere



High Class Trade Extension Knowledge

is costly; but it returns big profits.

Just like your best paying job—as contrasted with the one you lost money on.

Of these the latter required the most worry.

This represents the Greatest Matter of Fact Official Automobile Sheet Metal Work there is in all America or Europe. Detailing special designs is a bit of knowledge, not to be picked up every day, the public will pay big for.

In this Great Work we cover all General and Special Repairing, New Designing of all manner of Fenders, Hoods, Side Cars, special Runabouts to Racing Bodies embodying the finest geometrical construction of lines of staple and specialty designs to be found.

These Wonderful Drawings and Designs are now being sold for the first time outright to the public. They can be applied to any Make of Car, to any required measurements, and made up with any ordinary shop equipment. They are Sent You Free for 5 days' trial.

SEND NO MONEY. The Entire Work of 24 Blue Print Plates, 9x12 in size, with Text Pamphlets, will be sent you for 5 days' Free Trying Out. If you wish to keep them—just remit a check for \$10.00, which pays for them in full. If not, then send them back, and no harm will be done.

Use your business stationery as they are sent FREE to Shop Owners only. Journeymen Mechanics must order thru their employers, or a check for \$10.00 must accompany order. If the work is returned your money will be refunded in full. ORDER TODAY—IT'S THE GREATEST 1921 BUSINESS GETTER FOR MANY A SHOP.

ST. LOUIS TECHNICAL INSTITUTE

4543 Clayton Avenue

ST. LOUIS, MO.

FURNACE DEALERS ATTENTION



HERE IS SOMETHING
YOU ARE LOOKING FOR

The Little Draft-Man
Furnace  *Regulator*

SIMPLE and INEXPENSIVE

RETAILS FOR ONLY

\$18.00

SAVES ITS COST MANY TIMES.
EVERY FURNACE NEEDS IT. EASY TO SELL



WRITE FOR OUR DEALERS' PROPOSITION

DON'T WAIT ANOTHER DAY

SAHLIN MANUFACTURING COMPANY

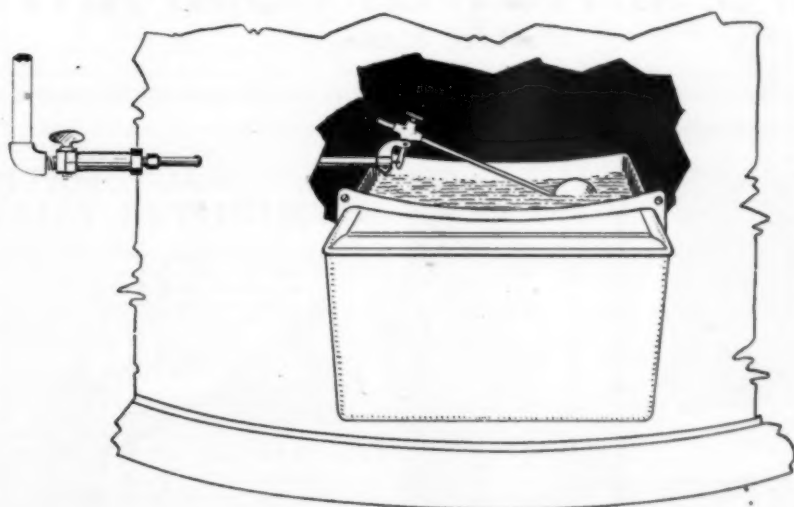
35 OTTAWA STREET

GRAND RAPIDS, MICH.

HUMIDICON

AN AUTOMATIC
HUMIDIFIER CONTROLLER

TRY THIS WATER PAN VALVE—AT OUR EXPENSE



Connect up with
any furnace and
to any kind of
water, Give it the
hardest test you
can think of.

**WRITE US
TODAY**

RIEKSE MFG. CO., 31 Ottawa Avenue, GRAND RAPIDS, MICH.



QUICK MEAL

Blue, Black or White
Porcelain Enameled
Coal Ranges

are the most up-to-date
ranges made.

They will last a lifetime.

Place your orders now.

Quick Meal Stove Co.

Division of American Stove Co. }

825 Chouteau Avenue

St. Louis, Mo.



YANKEE SMOKEPIPE DAMPERS

UNBREAKABLE

DURABLE

SENSIBLE

Our prices will surely interest you.

Manufactured by

THE S. M. HOWES COMPANY

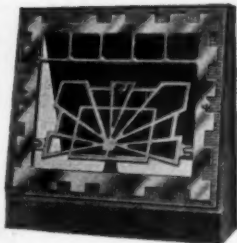
Boston, Mass.

SYMONDS MISSION DESIGN REGISTER

Is proving a trade and
profit booster for many
dealers. Why not you?

WRITE FOR CATALOGUE AND PRICES

SYMONDS REGISTER CO.
3117-23 Minnesota Ave., ST. LOUIS, MO.



HAYNES AUTOMA HUMIDIFIER VA

Here, Mr. Dealer, is the most
and successful automatic valve to be had.
small water weight tank and cast
iron weight do the work and
water pan filled. Your c
don't need to bother filling the
water pan if they have a
HAYNES VALVE in-
stalled. Show
them the
HAYNES and
your sales are
made. Let us
tell you more
about the
HAYNES
VALVE.



Write today for our circulars

HAYNES, 326-28 West 6th Street
KANSAS CITY, MO.

WE furnish repairs to fit all stoves, ranges, furnaces, etc. We also carry a full line of water fronts and water backs for cook-stoves and ranges.

Prompt Service at all times.

CENTRAL STOVE & FURNACE REPAIR COMPANY

1801 Diversey Parkway, Chicago, Illinois



Oval Stove Pipe Reducers

Reduce from 7 inches to 6 inches. They are made with a 7 inch oval bottom, which fits perfectly over the oval collar of stove or range and are reduced to 6 inches round top. They are used by all up-to-date stove dealers in preference to the 7 to 6 inch stove pipe.

Made of Uniform Color and Polished Steel.

SULLIVAN-GEIGER CO.

501-509 Madison Avenue, INDIANAPOLIS, IND.

**How
you can learn
to use the methods
used by experts
in your trade.**

You can learn in a short time the up-to-date ways of doing the many different jobs that come up in your work every day.

The leading men of the trade, men who command the highest salaries for their work, have written books that explain in detail the best and latest methods of working in sheet metal.

By reading and studying these books you can gain knowledge that has taken these men many years of much experimenting to obtain.

These men write from experience and actual working knowledge so they write in a practical style, a style you are able to understand at once.

We would be glad to send you a complete list of these instructive books which we sell.

Send your request to the
BOOK DEPT.

**AMERICAN ARTISAN
AND
HARDWARE RECORD**

620 South Michigan Avenue Chicago, Illinois

FURNACE REPAIRS

We carry complete stock

**NORTHWESTERN
STOVE REPAIR CO.**

654-666 W. Roosevelt Road
CHICAGO

Write for Furnace Repair Catalog

WRITE FOR CATALOG

**STOVE BOLTS
STOVE RODS
STOVE RIVETS**

THE KIRK-LATTY MFG. CO.

Cleveland

Cleveland

FURNACE & STOVE REPAIR PARTS

*The Largest Assortment of
Patterns in Existence.*

When others fail, write us.

THE NATIONAL STOVE REPAIR CO.

325 Sycamore St., CINCINNATI, OHIO

PATTERNS

FOR STOVES AND HEATERS

**FIRST-CLASS
IN WOOD and IRON**

VEDDER PATTERN WORKS ESTABLISHED 1835 **TROY, N. Y.**

PATTERNS FOR STOVES AND HEATERS

THE CLEVELAND CASTINGS PATTERN COMPANY
CLEVELAND, OHIO

IRON AND WOOD

STOVE PATTERNS

QUINCY PATTERN COMPANY
QUINCY, ILLINOIS

COPE-SWIFT CO., INC. STOVE PATTERNS

41-49 McDougall Ave. Detroit, Mich.

Saving Time and Money for the Sheet Metal Worker

The Lennox Serpentine Shear



is saving time and money every day for hundreds of manufacturers. If you use sheet metal to any great extent you will find this machine a money saver in your shop.

The following excerpts taken from letters prove this machine a time and money saver:

"We have two Lennox Serpentine Shears in operation, and must say that we are more than pleased with the work they are doing. We fully believe that our labor bill has been reduced 50 per cent since installing these shears."

Columbus Heating and Ventilating Co.,
Columbus, Ohio

"Soon after buying this machine we had a contract for making 3,500 incubator covers, which was all circular work, and this machine paid for itself on this job more than once alone. It is a perfect working machine."

H. E. Hessler Co.,
Syracuse, N. Y.

"It is a great labor saving device, and we recommend it highly for efficiency and service."

M. Wolfe & Co.,
Chicago, Ill.

We are building this machine in five sizes arranged for hand and belt or direct motor drive with capacity for cutting No. 16 gauge, No. 10 gauge, $\frac{1}{4}$ inch, $\frac{3}{8}$ inch and $\frac{1}{2}$ inch.

Write for complete descriptive bulletin.

JOSEPH T. RYERSON & SON

MACHINERY

CHICAGO ST. LOUIS DETROIT BUFFALO NEW YORK



*Samples
of
work*

SPECIAL NOTICES

Special Notices are charged at the rate of \$3.00 per inch per insertion

PATENTS
HUBERT E. PECK
Patent Attorney
Pacific Building, WASHINGTON, D. C.

FURNACE SALESMAN

A new Furnace Company located in Illinois, manufacturing an all cast iron furnace with all the latest achievements in furnace construction, is now ready to engage six furnace salesmen. Choice territory open. State salary to start, experience and references. Black Diamond Furnace Company Monmouth, Illinois.

24-3t

WARM AIR FURNACE SALESMEN

We have openings for several first-class furnace salesmen in desirable territory, engagement to begin about January 1st. Kindly give full particulars in first letter. Address the Wise Furnace Company, Akron, Ohio.

21-UPN

WARM AIR HEATER SALESMEN WANTED

Experienced men; also capable young men who wish to become salesmen. Give age, business experience and qualifications in first letter. Address L. J. Mueller Furnace Company, Milwaukee, Wisconsin.

24-3t



No. 45 Electric

Kimball ELEVATORS AND DUMB WAITERS
Hand Power | Passenger Electric | Freight
KIMBALL BROS. CO.
COUNCIL BLUFFS, IA.
610 Delaware, Kansas City

Remember this one fact—Anything of intrinsic merit can be successfully advertised.

SPECIAL NOTICES

FURNACE SALESMAN

Manufacturer of complete line of cast and boiler type warm air heaters. On commission basis. State territory desired and your experience in warm air heating. Address D-52, Care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois.

24-3t

FOR SALE

Established hardware and sheet metal business, located on one of the business streets on the north side of Chicago. Will bear closest investigation. Address D-37, Care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois.

25 ufn

SPECIAL NOTICES

SALESMAN WANTED

Experienced, for northern Ohio, for well established line warm air furnaces. Give past experience and state former territory. D-56, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois.

26-1t

WARM AIR FURNACE SALES MANAGER WANTED

For the Heating Department of an Illinois maker of stoves and furnaces. A reliable man with selling experience and practical knowledge of Warm Air Heating. Give full particulars in first letter and state salary required. Correspondence confidential. Address D-54, Care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois.

25-2t

STOVE AND FURNACE SALESMEN WANTED

For central and southern Illinois, by an Illinois manufacturer of high grade line. Give us your experience and qualifications fully and salary expected. Correspondence confidential. Address D-55, Care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Avenue, Chicago, Illinois.

25-2t

SALESMAN WANTED

EASTERN manufacturer of a well known make of stoves and furnaces desires first class salesman, also to act as manager of Western branch office.

Address D-47, Care of
AMERICAN ARTISAN AND HARDWARE RECORD
620 South Michigan Avenue, Chicago, Illinois

20-ufn

Your Prospective Customers

are listed in our Catalog of 99% guaranteed Mailing Lists. It also contains vital suggestions how to advertise and sell profitably by mail. Counts and prices given on 5000 different national Lists, covering all classes; for instance, Farmers, Noodle Mfrs., Hardware Dirs., Zinc Mines, etc. This valuable reference book free. Write for it.

Send Them Sales Letters

You can produce sales or inquiries with personal letters. Many concerns all over U. S. are profitably using Sales Letters we write. Send for free instructive booklet, "Value of Sales Letters."

Ross-Gould
Mailing Lists St. Louis

USE TOWNER'S SOLDERING FLUID

If you want the best results. It solders all metals, cleans and tins the coppers at the same time. TOWNER'S SOLDERING FLUID makes no fumes, and is not injurious to the. Write today for prices and full particulars. We also make F. A. Towner's Soldering Paste. Try some now.

F. A. TOWNER
MUSKEGAN, MICHIGAN

YALE

Russia Finish
patent Lock

STOVE PIPE

It is made of a very high grade of uniform color Blue Polished Steel and is coated to prevent rusting. Made in all sizes. Packed twenty-five and fifty joints to crate. For sale by the Jobbing Hardware Trade throughout the United States.

Manufactured by
HEMP & CO.
ST. LOUIS, MO.

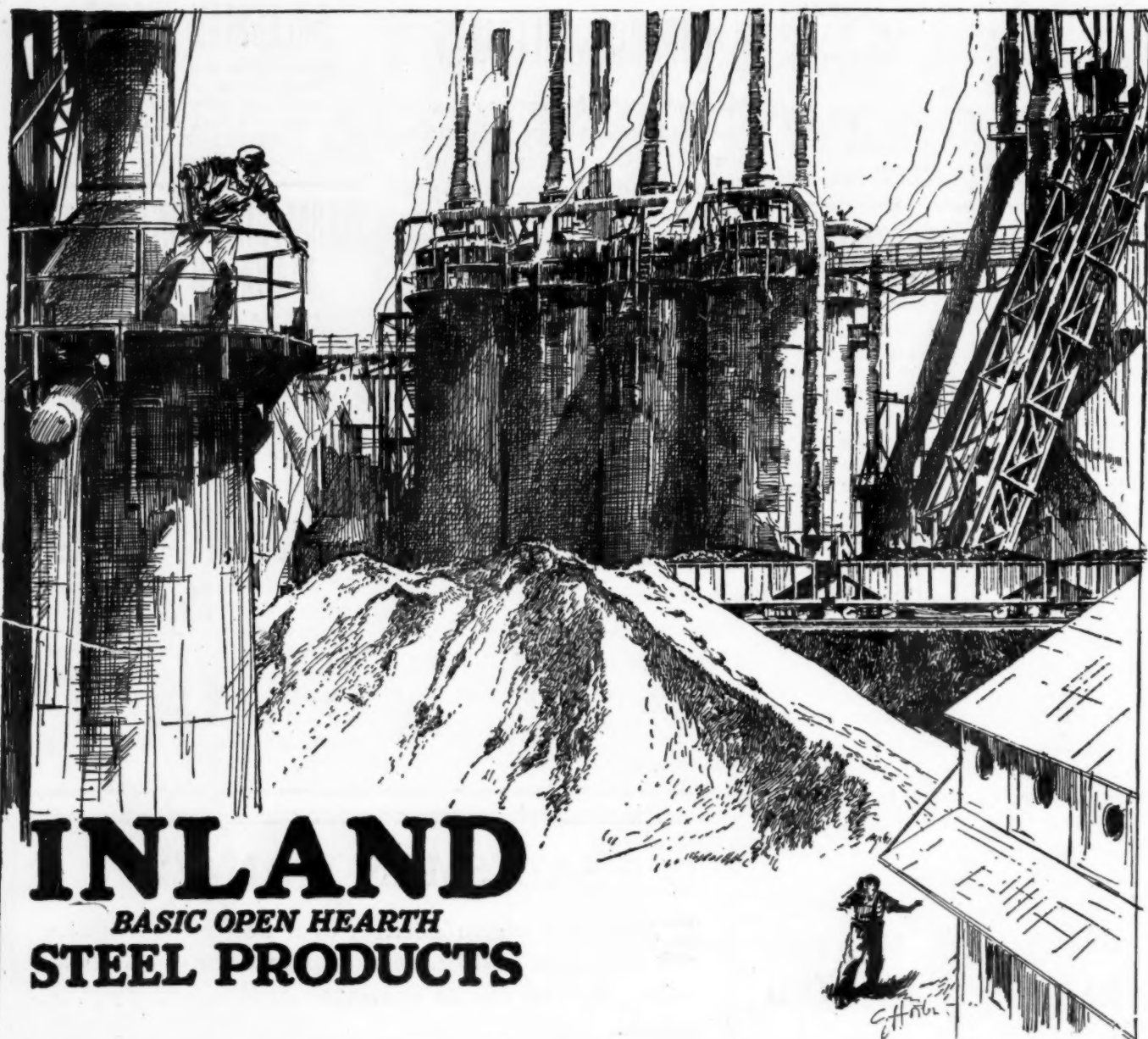
In the event your jobber does not handle this pipe send your inquiries to us.



ALUMINUM SOLDER

Will solder aluminum cooking utensils satisfactorily, without leaving the mended place rough or unsightly. Used with ordinary soldering iron. Is guaranteed to satisfy.

Write for circular today
GEO. E. ROESCH, 386 New York St., Aurora, Illinois



INLAND

BASIC OPEN HEARTH

STEEL PRODUCTS

Why Inland Quality is better than the Standard

In the blast furnace department, for instance, every man gets a bonus for tonnage—and an extra bonus for iron better than the standard.

This *above-standard* iron is made into steel of high quality—again, under the compelling in-

fluence of a worth-while bonus in hard cash.

You buy this steel, work it up into your product, and you gain the confidence of your customers, who, in turn, profit by quality that is better than standard. It pays.

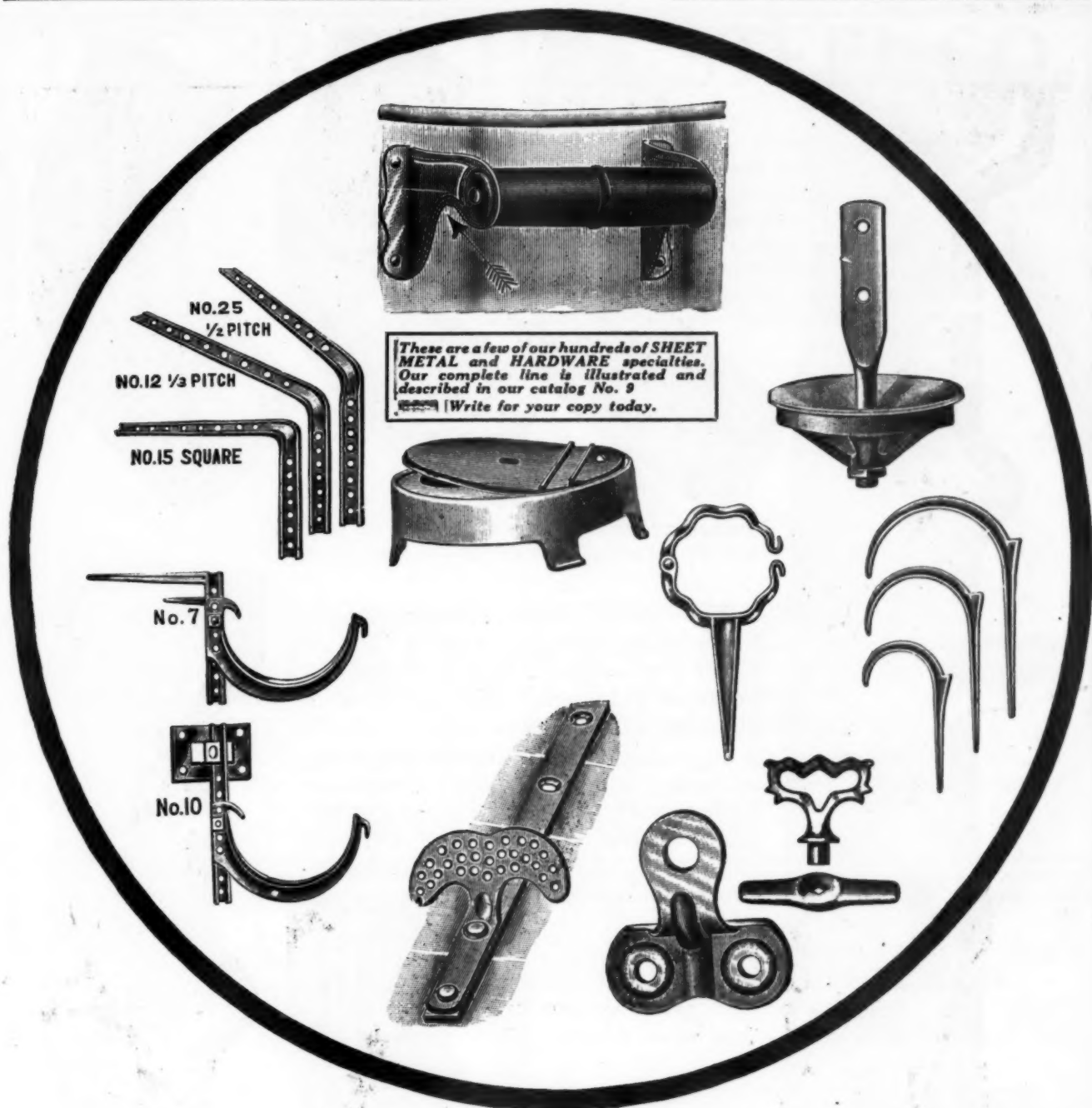
**Billets
Bars
Plates
Shapes
Sheets**

*Whatever your steel problem
may be, bring it to Inland*

Branch Offices:
Dallas Denver Detroit
Los Angeles Milwaukee

INLAND STEEL COMPANY, First National Bank Bldg., Chicago
Works: Indiana Harbor, Ind., and Chicago Heights, Ill.

Branch Offices:
San Francisco Seattle
St. Louis St. Paul



EVERYTHING for the TINSMITH

THE LARGEST AND MOST COMPLETE STOCK IN THE STATES

FOR many years we have served the trade and our present large business has been built up by thousands of dealers throughout the country who have given us their patronage because of the QUALITY and SERVICE which serves as the foundation of every sale we transact.

We are manufacturers as well as merchants and our large organization and modern facilities enable us to give all orders, both large and small, prompt attention.

We at all times have the welfare of our customers in mind and our motto is: *"Everything Must Be Right"*.

Our latest catalog lists practically every article in your line and contains much general information which you should have on hand. Write today for a copy of this large catalog, send us your next order and become one of our host of satisfied customers.

Is there something you need now? Let us give you our prices.

BERGER BROTHERS COMPANY

229-231-233-235-237 ARCH STREET

WAREROOMS AND FACTORY: 100 TO 114 BREAD STREET, PHILADELPHIA, PENNSYLVANIA



Illustrations show elbows of all angles from 10 to 90°. Note how close each cluster of elbows hugs the wall.

Use short angle elbows to get around sills, cornice mouldings and all other projections, thus preventing the commonly known soldered break in the pipe.

By using combinations of this kind, soldering is not necessary as elbows fit into each other very snug and the small opening at the joints will permit sewer gases to escape, thus increasing the life of the entire spout.

These elbows are made in all designs and your dimensions can be arranged right on the job.

TRADE MARK
F. Dieckmann

This Emblem of Quality is stamped in each.

THE FERDINAND DIECKMANN COMPANY
P. O. Station B Cincinnati, Ohio

THE BRIER HILL STEEL CO.

MANUFACTURERS

Washed Metal, Basic and Bessemer Pig Iron, Low Phosphorus Pig Iron, Forging and Re-rolling Billets, Slabs, Sheet and Tin Bar

PLATES and BLUE ANNEALED—12 Ga. to 2" Thick—Rolled on 84" and 132" Mills
SHEETS—Blue Annealed, Black and Galvanized—10 Gauge and Lighter

Formed Rolling and Siding, Special Finish Sheets for Automobile and Furniture Manufacture, Deep Drawing Stock, Etc.



PICKLED STOCK

2" Thick and Lighter—72" Maximum Width—222" Maximum Length



GENERAL OFFICES: Youngstown, Ohio

DISTRICT OFFICES: New York, Chicago, Philadelphia, Cleveland, Kansas City, Lynchburg, Pittsburgh, New Orleans, Salt Lake City, San Francisco, San Antonio

EXPORT AGENTS: Consolidated Steel Corporation, New York City.

CORTRIGHT METAL SHINGLES

—And as to the durability of Cortright Metal Shingles—

25 years is not an uncommonly long time for a Cortright Metal Shingle roof to protect a building from wind, rain and fire. Cortright Metal Shingles come HAND DIPPED GALVANIZED, GALVANIZED TIGHT COAT AND IN TIN PAINTED RED AND GREEN—all in 4 patterns. Get our proposition, also our book, Concerning That Roof.

CORTRIGHT
Philadelphia



METAL ROOFING CO.
Chicago

STANDARD

SINCE 1887

Get Acquainted With and Install the



AMBCO
VENTILATOR
PATENTED

One of the newer revolving ventilators with several distinctive improvements worked into its design as the result of a wide experience with many types of ventilators.

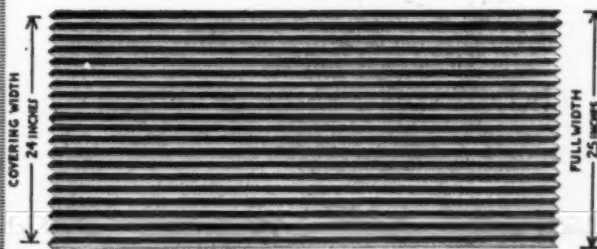
The AMBCO VENTILATOR has the efficiency to ventilate under any wind pressure. This means it is in action at all times, disposing of impure air, gases, smoke, and vapors.

You should know all about it.

Write today for descriptive booklet

THE A. M. BASMAN CO., Inc.
468 West Fort Street, Detroit, Michigan

"OLD CHATEAU" Zinc Roofing



WE make all sizes corrugated and V crimp from Pure Zinc Sheets of our own manufacture.

Zinc roofing is a solution to the roofing problem—needs no painting—will not rust.

Send for samples and prices

THE AMERICAN
ZINC PRODUCTS CO.

269 American Avenue

Greencastle, Indiana

GOOD REASONS WHY CHICAGO STEEL CORNICE BRAKES are used by Good Tinsmiths



8-ft. for 18 gauge and lighter.
Made in all sizes.

This brake has a patented construction — heavy steel plates arranged so that the strain is directly on the edge. Steel Castings are used where there is a strain. Special steel edges protect the upper jaw and apron from abuse. A perfectly balanced construction assures rapid and easy operation.

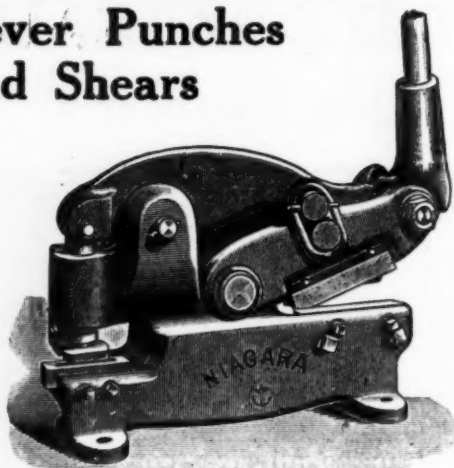
Our new catalog No. 19, showing the different styles and sizes, will be sent at your request.

Write Today

DREIS & KRUMP MFG. CO.

2915 S. Halsted Street, CHICAGO

NIAGARA Lever Punches and Shears



We offer and carry in stock a large variety of types and sizes—some for punching or shearing only, others for both operations.

Ask for Catalog 56 SA

NIAGARA MACHINE & TOOL WORKS
BUFFALO, N. Y.

Manufacturers of Tools for Sheet Metals (9)

Here is Another Whitney Punch used by many men

No. 5 Jr.
Whitney
Punch

"The Best
by Test"



A sturdy Whitney Punch which will cut a 1/4-inch hole through No. 18 gauge iron. This model Whitney Punch is slightly crowned to eliminate friction so that all power is directed to the center of the punch. All wearing parts of Whitney Punches are hardened so they will withstand extra long use. The Whitney Line of Punches has met with approval by thousands of users. If you need a fast, strong but light and portable punch, you need a Whitney. Let us tell you more about them.

Write for our catalog and price list today

WHITNEY METAL TOOL CO., Rockford, Ill.

Best by Test of Ten Years Over 17,000 in Use

Installed in
Six U. S.
Navy Yards
and Arsenals

Simplest Construction, Fewest Parts,
Easiest Operated and Changed.

HUNDREDS USED BY UNCLE SAM

Position to
change punches

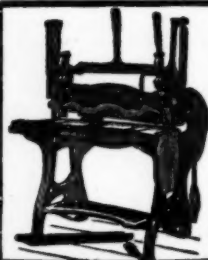
Only Portable Channel Iron Punch on Market. Capacity 1/4 thru 1/2 Iron. Punches to center of 4 inch Channel Iron, with 1 1/2 inch flanges. All parts interchangeable with No. 2 Punch.

No. 2 Punch—
Capacity 5/16
thru 1/2 Iron.
Length 23 in.



No. 1 Punch—
Capacity 3/8 thru
1/2 Iron. Ask your
Jobber, or write
us for Prices and
Recommendations.

W. A. WHITNEY MFG. CO., ROCKFORD, ILL.



TREADLE SHEAR

This TREADLE GAP SHEAR is made in all standard sizes for No. 14 and lighter gauge sheets. With it, sheets can be squared, trimmed or slit.

We make a complete line of shears, punches and bending rolls, all sizes for hand or belt drive. Write for Catalog "F."

BERTSCH & COMPANY, Cambridge City, Ind.

C. G. HUSSEY & CO.

Rolling Mills and Office, PITTSBURGH, PA.

Manufacturers of

SHEET COPPER, BOTTOMS, ROLL COPPER, TINNED AND POLISHED COPPER, NAILS, SPIKES, RIVETS, CONDUCTOR PIPE, EAVES TROUGH, ELBOW, SHOES, MITRES, ETC.

Branch Warehouses in New York, Chicago and St. Louis

"Never make the same mistake twice"—if you were not advertising yesterday, start today.



Send for catalog today

VIKING SHEAR

Compound LEVER Handle—Removable Blades

A child can work them

VIKING SHEAR CO., ERIE, PA.

Durability—Service—Satisfaction

APOLLO-KEYSTONE
COPPER STEEL
Galvanized

Sheets




Highest in quality and rust resistance. Unequaled for Culverts, Flumes, Tanks, Roofing, Siding, Spouting, and all exposed sheet metal work.

We manufacture Sheet and Tin Mill Products of every description—Black and Galvanized Sheets, Corrugated and Formed Products, Roofing Tin Plates, Etc.

AMERICAN SHEET AND TIN PLATE COMPANY, Pittsburgh, Pa.

AJAX OUTLET and END-PIECE COMBINATION FITTING



for Half-Round Eaves Trough

Right and Left in One
Also Fits Double Bead
Apply in a Minute
Frost-Proof
Soldering Unnecessary

Manufactured by
Ajax Bracket and Outlet Co.
3901 Parkdale Road
Cleveland Heights, Ohio, U. S. A.

Pat. Dec. 28 1911

STEEL CEILINGS SIDE WALLS AND CORNICES

Only first quality material used.
Many neat designs of character.

Write today for our complete catalog giving descriptions and prices.

THE W. J. BURTON CO.
Junction Ave. and Federal St. and 436 Penobscot Bldg. Detroit, Michigan

NEW ROTATABLE STANDARD VENTILATORS and CHIMNEY TOPS

A combination that has no equal for chimney purposes; positively cure down draft, obviate the necessity for high stacks and are ornamental. For sale by all jobbers.

Ask for circular and discounts.
Manufactured by
STANDARD VENTILATOR CO., Lewisburg, Pa.




PERFORATED METALS

OF EVERY DESCRIPTION
MANUFACTURERS OF
PERFORATED STEEL PLATES AND SHEETS
(Black and Galvanized)

Perforated Sheet Copper, Brass, Bronze, Aluminum, Lead, Zinc, Monel Metal and Other Alloys

Screens Plates and Sheets
for Ores, Coal, Stone, Cement, and all kinds of

Grain Cleaning and Sorting Apparatus,
for Centrifugal Linings, Filter Press Plates, Drying Floors, False Bottom Strainers, Extractor Baskets, Revolving Screens, Shaking Screens, Chute Screens, Grilles and Ornamental Screens,
for Radiators, Ventilators, Air Vents, Heat Vents, in Private and Public Buildings, made to suit local requirements.

PERFORATED TIN AND BRASS IN STANDARD SIZES
carried in stock
ANYTHING IN PERFORATED METAL

THE HARRINGTON & KING PERFORATING CO.
610 NORTH UNION ST.—CHICAGO, ILL. U. S. A.
NEW YORK OFFICE 114 WEST 27 ST.

ART METAL CEILINGS AND SIDE WALLS

QUALITY—DURABILITY—BEAUTY

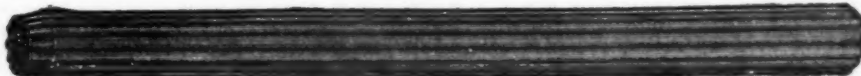
Are thoroughly combined in **FRIEDLEY-VOSHARDT ART METAL CEILINGS AND SIDE WALLS.** We have added to our list a great number of new and handsome designs. Special designs can be made if desired. Only the **best** of materials used. We are prepared to serve **you.** Ceiling Catalog No. 33 on request.

DON'T DELAY—WRITE TODAY.

FRIEDLEY-VOSHARDT CO.
Office: 733-737 S. Halsted St. Factory: 761-771 Mather Street
CHICAGO, ILLINOIS

Galvanized Eave Trough and Corrugated Expanding Conductors

Made of
Keystone
Copper bearing Steel



Clark-Smith Hdw. Co.
Peoria, Ill.

Costs no more
lasts longer
Therefore
Cheapest

THE HESSLER

PLUMBERS
ROOF FLASHING

The very best
one made

The Plumbers Know

Write for particulars today

H. E. HESSLER CO.

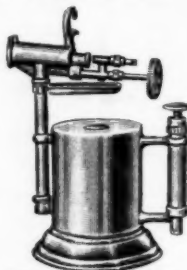
Sole Manufacturers

SYRACUSE, NEW YORK

Former Manufacturers of the McGuire



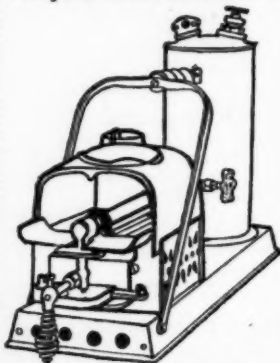
Turner New Gasoline-Kerosene TORCHES



**THE TURNER
BRASS WORKS**
Sycamore, Illinois, U.S.A.

The Burners are all constructed alike, containing all the patent features, however different in size according to price. The baffle in the burner will generate the low grade gasoline or kerosene without adjustment. The adjusting needle eliminates enlarging of orifices that make all burners useless. The flared tube will siphon the correct amount of air regardless of adjustment or size of flame. The patent pump involves the parachute principle. Leather is free and will not wear. Drip cup made of sheet steel stamped, copper plated. Burner generates easily and produces more heat on less fuel than our old line. Our Triple Jet takes the place of our well known Double Jet, involving all the new patent features. A trial order will convince you. If not satisfactory, money refunded. All parts interchangeable. Jobbers will carry repairs—not necessary to be without torch—fix it yourself. With ordinary use a torch will last a lifetime.

Improved Models of Soldering Furnaces



Have you seen the improved models? The greatest line of Soldering Furnaces today on the market. They should be. There is more experience behind them. Forty-eight years of it! The Gems were popular before the majority of present day furnaces were heard of. It is the oldest, the recognized standard Soldering Furnace today.

Look these models over. Each leads its class. Line them up and take your choice.

Do you want a Catalog?

Improved No. 3 Gem with pump.

BURGESS SOLDERING FURNACE CO.
DEPARTMENT A - - - COLUMBUS, OHIO

FABRICATED STEEL PRODUCTS
METAL ROOFING and SIDING
HOLLOW METAL WINDOWS and DOORS
SKYLIGHTS

THE SYKES COMPANY

930 W. 19th Place

CHICAGO, ILL.

Be Prepared



No. 114
Red-Hot Torch

Every Mechanic who is supplied with Red-Hot Torches and Fire Pots is better prepared to compete with his competitors for he has the most up-to-date tools on the market and he is in position to take care of the many emergency orders of the winter season quicker and better, thereby saving time and money, besides pleasing and satisfying his customers. Are you prepared? Jobbers will supply you at factory prices.

Send for free catalog.

ASHTON MFG. CO.

Newark, N. J., U. S. A.



No. 208 Torch
List Price Each \$16.90
Ask for Discount

Our Patents and Allowed Claims

protect us and you in the sale and use of the most Wonderful improvement in Kerosene and Gasoline Burning Tools. The Double Blunt Point Needles stop over sixty percent of torch troubles. Save time and fuel. Produce two to three hundred degrees more heat. Booklet is free. Jobbers sell at factory price.

CLAYTON & LAMBERT MFG. CO.
DETROIT, MICH., U. S. A.

The Sheet Metal Worker—

Be he Apprentice or Journeyman—who fails to secure a copy of the

“XXth Century Sheet Metal Worker”

IS OVERLOOKING A MIGHTY GOOD THING

It is new, modern, practical—the work of an experienced sheet metal worker—and told in plain, every-day language, without any frills or trimmings of any kind. In all its eighty-six valuable pages there is not one complicated, long-drawn-out explanation, not one mystifying, scientific rule. But there is an abundance of “short cuts,” instantaneous helps and suggestions for all kinds of sheet metal work, both simple and complicated—also—illustrated problems and designs with practical descriptions and explanations.

The “XXth Century Sheet Metal Worker” is furnished in flexible cover for 60 cents, or cloth cover for \$1.00, postage prepaid. For sale by all book sellers or by

AMERICAN ARTISAN AND HARDWARE RECORD

620 MICHIGAN BOULEVARD, CHICAGO, ILLINOIS

\$100.00 REWARD

will be paid to the hardware dealers or clerks who succeed in making and delivering to us before February 15th, 1921, the four best window displays entered in this contest.

\$50.00 Reward for Capturing First Prize
\$25.00 Reward for Capturing Second Prize
\$15.00 Reward for Capturing Third Prize
\$10.00 Reward for Capturing Fourth Prize

AMERICAN ARTISAN AND HARDWARE RECORD

Window Display Competition

Here are the rules—Read them

The photographs must be accompanied by descriptions of how the window displays were arranged and the materials used. The description is important and hence should be adequate. These photographs and descriptions may be sent by mail or express, charges prepaid, and must reach this office not later than February 15, 1921. Address all photographs and descriptions to AMERICAN ARTISAN AND HARDWARE RECORD Window Display Competition, 620 South Michigan Avenue, Chicago, Illinois.

Each photograph and description must be signed by a fictitious name or device and the same name or device must be put in a sealed envelope containing the real name and address of the contestant. This sealed envelope is to be enclosed with the photograph. Contestants are permitted to enter as many photographs of displays as they please.

A Competition Committee of three will be appointed. One of them will be an expert window dresser and one an experienced hardware man. This Committee will pass upon the merits of all photographs and descriptions received, without knowing the names or addresses of the senders, and will decide the winners of the Competition.

AMERICAN ARTISAN AND HARDWARE RECORD reserves the right to publish all photographs and descriptions submitted.

AMERICAN ARTISAN AND HARDWARE RECORD WINDOW DISPLAY COMPETITION
620 South Michigan Avenue **CHICAGO, ILLINOIS**

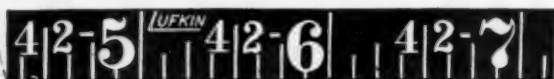
LUFKIN TAPES



FAMILIARLY AND FAVORABLY KNOWN

Their reputation, long and well established and maintained assures a ready sale.

Pioneers in connection with the noteworthy tape improvements such as *Instantaneous* readings.



and many other features.



Stocked by Jobbers.

**TAPES
STEEL & WOOD RULES**
SEND FOR CATALOG

THE LUFKIN RULE CO.
SAGINAW, MICH.
New York

WIRE

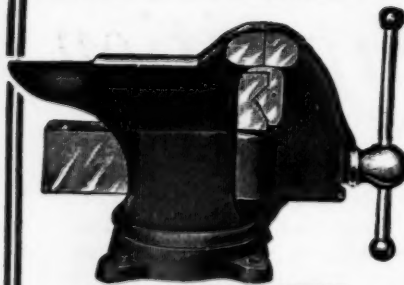
electrical, rope, air-plane, piano, pipeorgan, flat wire (strip steel) hoops, bale-ties, tacks, nails, barbed-wire, concrete reinforcement,

springs, netting, wire fences, steel posts, steel gates, trolley wire and rail bonds, wire wheels, auto-towing cables, horse shoes, round and odd-shape wires for manufacturing.

Illustrated books describing uses, FREE

American Steel & Wire
Chicago—New York Company

ROCK ISLAND AUTOVISES



241—SWIVEL AUTOVISE

Send for our New Catalog

ROCK ISLAND MFG. CO.
ROCK ISLAND, ILLINOIS

This is called our **SWIVEL AUTOVISE**. 34" jaws, weighing 80 lbs., and is adapted for automobile and heavy repair work. We also make a stationary autovise known as No. 231 with 3" jaws, weighing 32 lbs., and is suitable for the individual automobile owner. These vises are a combination of vise jaws, pipe jaws and anvil.

We make the largest and most complete line of vises.

DUMB WAITERS and Hand Power Elevators.

Standard sizes in stock for immediate shipment.
Blue prints and full directions for erecting with each outfit.

Complete catalogue on request.

SEDGWICK MACHINE WORKS
Specialists for Twenty-five Years 165 W. 15th Street, NEW YORK

HELLER FILES AND HORSE RASPS CUT WELL & WEAR WELL

"FILES OF QUALITY"

The kind of files good mechanics want

—AND—

The kind of files live dealers sell.

Know All About Them
Write for Our Catalog Today

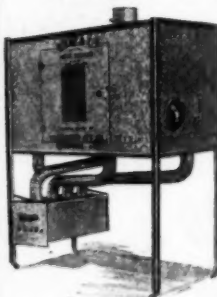
HELLER BROS. CO.

NEWARK, NEW JERSEY

Established 1836

Incorporated 1899

MR. DEALER



Are you selling our PORTABLE MEAT SMOKER?

With our new facilities we are in better shape this year to take care of the trade.

Better order your floor sample now, as it is the best Salesman you ever saw, and the only Smoke House sold through the dealer only.

Let us mail you catalogue and discounts.

CHATSWORTH MANUFACTURING CO.
CHATSWORTH, ILLINOIS, U. S. A.



Country Homes need Sash Balances

Sell the CALDWELL. For thirty years they have stood the test of service. Ask your Jobber.

CALDWELL MFG. CO.
30 Jones Street Rochester, N. Y., U. S. A.

ADVERTISING PULLS.—"If there is one thing on earth that a quitter should leave severely alone, it is advertising," says John Wanamaker. "To make a success of advertising one must be prepared to stick to it like a barnacle on a boat's bottom. Advertising doesn't jerk; it pulls. It begins very gently at first, but the pull is steady. It is likened to a team pulling a heavy load. A thousand spasmodic, jerky pulls will not budge that load, while one-half the power in steady effort will start it and keep it moving."

THE NAME "COES"

on a wrench is a
guarantee of

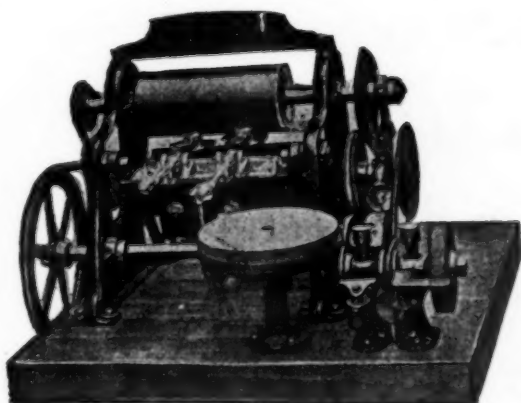
Service
Durability
Strength
Satisfaction

"Coes" wrenches are well known—as staple as nails. They are guaranteed to have 30 per cent greater strength than other makes.



COES WRENCH CO.
WORCESTER, MASS.

A New 2 Blade Sharpening Machine



Many small hardware dealers will welcome this perfectly wonderful little HATFIELD machine which sharpens every one of the 300 different makes of Safety Razor Blades, besides all sizes of Shears, Scissors, Knives, Planes, Chisels, Jack Razors, etc.

It is a thoroughly complete, small sharpening machine on a 24" board.

Write for price, which is so low we are having a big sale on it.

HYFIELD MFG. COMPANY
21 Walker Street NEW YORK CITY



You need never hesitate in making any claim as to the safety of the Iver Johnson. Thumps, jolts, jars, knocks—cannot discharge it. You can actually "Hammer the Hammer." Only one way to discharge the Iver Johnson—pull the trigger all the way back.

That's why the Iver Johnson is easy to sell. Sales are closed with a minimum of time and selling effort.

IVER JOHNSON SAFETY—AUTOMATIC REVOLVERS

The Iver Johnson stays sold. No come-backs, no complaints. Its automatic safety feature, its simplicity and strength of construction, its assurance of accuracy and dependability—all these features create good will, which reacts favorably on Iver Johnson dealers.

Stock the entire line—22, 32, 32 special and 38 calibers, Hammer and Hammerless models with Regular, Perfect Rubber and Western Walnut grips. Why not stock Iver Johnson shotguns, too? Then you can capitalize on the entire Iver Johnson line of firearms.

Send for free catalogs which show the entire line of Iver Johnson firearms. Complete dealer information will be sent you. Write for information on bicycles and motorcycles, too

IVER JOHNSON'S ARMS & CYCLE WORKS
354 River Street, Fitchburg, Mass.

717 Market Street
San Francisco

99 Chambers Street
New York

"The Safe Revolver to Sell"

This Warm Air Heater Special

is not only the largest issue published by
AMERICAN ARTISAN
=====AND=====
HARDWARE RECORD

but contains more useful information and definite instructive matter than has ever been published by any trade paper in this field.

MORE ADVERTISING PAGES
are used by manufacturers of Warm Air Heating Apparatus and Supplies in this issue than have ever been carried by any publication, thus demonstrating once more our

WELL ESTABLISHED SUPREMACY
as an advertising medium in the Warm Air Heating Industry and Sheet Metal Trade.

WATCH OUR DEPARTMENTS
grow in 1921. Our plans for all our departments—Hardware, Stove, Sheet Metal and Warm Air Heating and Ventilation will make **AMERICAN ARTISAN AND HARDWARE RECORD** even more helpful and profitable than it is now.



KEEP YOUR STOCK UP-TO-DATE

A man walks into your store.

He asks for a certain article.

If you have it he buys it, becomes a satisfied customer and a good advertisement for you.

If you are in our territory we can help you keep your stock up-to-date. We have on hand at all times a large stock of **GENERAL HARDWARE**. Those articles which you might order that are not generally stocked can be obtained for you in the shortest possible time. We handle the best makes in each line. You can rely on the **QUALITY** of goods that you buy from us. Look over your stock now.

For over 28 years we have served thousands of dealers continually. Write us today. If we can serve you it is to our mutual benefit.

Write us today for further information.

GARDEN TOOLS, GENERAL AND BUILDERS' HARDWARE, MECHANICS' TOOLS, CUTLERY, GUNS, AMMUNITION, SPORTING GOODS AND FISHING TACKLE.

BULLARD & GORMLEY CO.

WHOLESALE HARDWARE

**54-62 EAST LAKE STREET
CHICAGO, ILLINOIS**



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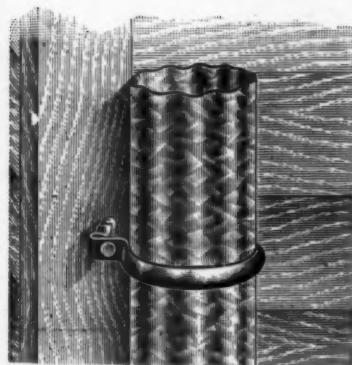
"Milcor" Ends and Drops



"Triplex" Hanger



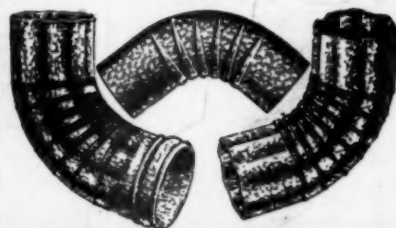
Steel Strap Hangers



"Direct Drive" Conductor Hooks



"Perfection" Wire Conductor Hangers



"Milco" Flat Crimp Elbows



Complete Line of Rain-Carrying Specials

AND

- "Invisible Joint" Metal Ceilings.
- "Netmesh" Expanded Metal Lath.
- "Expansion" Corner Beads
- "Superior" Corner Beads.
- "Bull Nose" Corner Beads.
- "Milcor" Curved & Straight Base Screeds.
- "Titelock" Metal Shingles and Tile.
- All Kinds Flat and Corrugated Roofing.
- Plain and Ornamental Ridging, Hip Shingles and Finials.
- "Puttyless" and Standard Skylights.
- "Milcor" Embossed Cornices.
- "Alpina" Siphon Revolving Ventilators.
- "Milcor" Vents and Ventilating Systems.
- Silo Caps and Hog House Ventilators.
- "Milcor" Building Corners for Lap and Drop Siding.
- Galvanized Porch Flower Boxes—Aluminum Painted.
- "Puttyless" Hot Bed Windows.
- "Milcor" Corrugated Steel Stock Tanks.
- "Milcor" Hog and Chicken Waterers.
- "Milcor" Indestructible Hog Troughs.

Milwaukee Corrugating Co.

MILWAUKEE, WIS.

Branch Office and Factory at Kansas City, Mo.
Minneapolis Branch, 929 Lumber Exchange

